THE IRON TRADE REVIEW

Volume XLIII CLEVELAND, NOVEMBER 5, 1908 Number 19

GREAT ACTIVITY

CHARACTERIZES THE PIG IRON MARKET

And Much Better Feeling Caused by Election Results—Many Structural Orders Awarded and Others in Prospect.

Decided improvement has characterized the pig iron market within a few days, which, it is believed, indicates a permanent change for the better. The result of the presidential election has cleared the atmosphere, and moderate buying in all lines is expected. Conservative men are, however, disposed to be cautious and do not expect too sudden or great an increase in the volume of business.

Steel Bars and Wire

The leading interest received orders and specifications for 25,000 tons of steel bars in October. Other manufacturers of steel bars are well supplied with specifications, and numerous promises of orders and specifications to follow the election have been received. Although this is the quiet time of the year for the wire business, conditions are very satisfactory. The principal contract for the week for cast iron pipe was 3,500 tons for Helena, Mont.

Many Pig Iron Sales

Pig iron transactions made within a few days include 50,000 tons of foundry grades at Cincinnati, 20,000 tons of high phosphorus iron at Chicago for an agricultural implement interest, 10,000 tons of foundry iron to an Indiana concern, 5,000 tons of basic at St. Louis, and 2,500 tons at Pittsburg to an Ohio steel interest, orders for lots of 5,000, 3,300, 2,500 and 2,400 tons of foundry iron at Pittsburg, 3,000 tons of malleable at Dayton, O., and a large number of smaller orders. A Massillon pipe interest sent out an inquiry for 27,000 tons of foundry grades contingent upon election, and many other orders are expected to follow Tuesday's political results. There is a noticeable tendency toward strength in prices, and it is anticipated that advances will soon be announced.

Railroad Buying

The railroads are showing more activity. The Northern Pacific has specified on 12,000 tons of rails to the Lackawanna Steel Co., while the Rock Island has specified on 5,000, to be rolled by the Illinois Steel Co. The Missouri Pacific has placed an order with the American Car & Foundry Co. for the repair of 6,000 freight and 75 passenger cars; the Illinois Central has ordered 400 convertible cars, and the Santa Fe has ordered 5,000 tons of steel for bridge and viaduct construction.

Structural Material

The volume of new business in structural material awarded or in prospect is very large, and includes bids on the new Chicago city hall, and contracts for Mississippi river bridges, making an aggregate of 24,000 tons. During the last week of October, the majority of the orders went to independent interests, which obtained 25,000 tons, including 970 tons for an office building in New York to the Brown-Ketcham Iron Works; 1,875 tons for the Carnegie Central Library, St. Louis; 2,550 tons for the Cincinnati Southern viaduct, to the Riter-Conley Mfg. Co.; First National Bank building, Pittsburg, 4,200 tons, to the Pittsburg Steel Construction Co.; Chicago sanitary bridge system, 4,200 tons, and numerous orders ranging from 100 to 500 tons. Inquiries for structural material are continually increasing, and the outlook is very encouraging.

Coke and Old Material

Drouth still continues to interfere with operations in the coke regions. Furnaces and foundries are showing more disposition to contract, and prices are firm. In old material, prices are well maintained, but transactions are not numerous. Iron ore shipments from the Lake Superior regions for October make a surprisingly favorable showing, the total being slightly in excess of 5,000,000 tons, the highest record of the year. Shipments to Nov. 1 amounted to 21,730,072, and the prospect is that shipments for the year will amount to about 25,000,000 tons.

HEAVY INQUIRY FOR IRON RECEIVED BY WIRE.

(Special Telegram.)

New York, Nov. 4.—Good inquiry for iron was received by wire this morning. The extent to which results were discounted is shown by a large local selling house's sale sheets of last week which were the largest in two years. The Northern Pacific has reinstated 12,000 tons standard sections with Lackawanna Steel Co. for early rolling. The Chesapeake & Ohio takes 2,000 from the leading interest.

PIG PRICES ADVANCE.

(Special Telegram.)

Cincinnati, Nov. 4.—Iroquois and Cleveland furnaces have advanced prices 50 cents. The Girard furnace has withdrawn from the market. No change in southern iron. Several telephone inquiries have been received for 500-ton lots this morning.

PIG IRON SALES.

Pittsburg, Nov. 4.—Sales of pig iron just made include 2,500 tons of basic to an Ohio steel interest and 2,500 tons of northern and southern foundry to a Pittsburg melter. A part of the foundry iron went at $12.50 Birmingham, but that price is now disappearing, and it is recognized that $13 will be the asking price.

THE WEEK IN IRON CENTERS

PITTSBURG.

Much Improvement in Pig Iron—Brighter Prospects in All Lines.

Office of THE IRON TRADE REVIEW, 510 Park Bldg., Nov. 3.

Additional grounds for encouragement are to be found in the record made by the month of October in the iron and steel industry. This month began without especial promise, but developed a gradual improvement as it advanced and ended with a good margin upon the gain side of the ledger. The fact that October under normal conditions is usually one of the most active business months of the year tends to diminish its importance as a likely index of the future, but its record in the present state of business affairs is nevertheless reassuring.

One of the larger steel interests reports an increase of approximately 15,000 tons in total specifications received in the month for all its finished products as compared with the preceding month and the fact that its best record of the year was established. Other prominent companies, notably some fabricating interests, enjoyed their best month of the year, both from the standpoint of new business booked and tonnage shipped.

The pig iron market in October was undoubtedly the most active of the present year after a number of months of comparative listlessness on the part of buyers. The question that is now agitating the minds of the furnacemen, however, is just how far the present movement is purely speculative by reason of the influence exerted by the presidential election and whether the enlarged field of buying may be looked upon as reasonably permanent. There is reason for believing that some, at least, of the sales being put through are not being prompted by actual, uncovered requirements and that the low prices for forward delivery are particularly attractive for speculation.

The general iron and steel market continues to be characterized by a disposition of consumers to buy cautiously for the future and to rely upon quick shipment deliveries by the mills. The rail, plate and in a less degree, the structural markets, still show the effect of the light buying by the railroads.

Pig Iron.—A lively movement in pig iron continues under way, with the foundry grades leading in activity. Sales are well distributed, indicating a general satisfaction among melters as to the attraction offered by the present market, although the tonnage actually booked falls considerably short of the inquiry, which is especially heavy. Extended deliveries are usually being sought and furnace interests are finding themselves in doubt as to the speculative element in these purchases, which has been adduced by the election at hand. Some furnaces are declining to sell for next year's delivery except at their own ideas of prices and the market, because of the greater demand, undoubtedly has a stronger tone.

While No. 2 foundry iron has sold in this movement as low as $14.50 for first half, this figure is now less available because the particular selling interests indicate they have booked all the low-priced tonnage they desire. The market now ranges from $14.75 to $15 for the first quarter and first half. An electric company took about 5,000 tons of foundry; another melter, 3,300 tons; another, 2,400 tons; several 2,000 tons, while sales of less tonnages were comparatively numerous. One furnace has reported sales approximating 30,000 tons of foundry and forge in the past several weeks. Another seller disposed of 13,000 tons, mostly foundry, the past week. Prompt foundry iron is selling under contract, the question of stocks figuring in these transactions. The Massillon Iron & Steel Co., Massillon, O., has an inquiry out for 27,000 tons, of Nos. 2, 3 and 4, in equal lots for first half, the closing of which is made expressly contingent upon the result of the election.

Basic iron is firmer and $14 for prompt and first quarter shipment has been refused this week in several cases. It is no longer believed that $14 can be shaded. The market is held from $14 to $14.25 for spot and first quarter, and $14.25 to $14.50 for first half. Sales are less heavy. The Fannie furnace at West Middlesex, Pa., which had been on basic, has been blown out.

The Bessemer average for October was $14.58 valley or $15.48 delivered Pittsburg, against $15 valley in September, $15.21 valley in August, and $15.83 valley in July. The market ranges from $14.50 to $14.75 for prompt and $14.75 for first half. A lot of 3,000 tons for first quarter went this week at $14.75 valley. A sale of 4,000 tons of malleable for delivery over the entire year was made at about $14.75 valley. The present market is from $14.25 to $14.50 valley.

Southern iron is selling more readily. The larger sellers report increased business during the past several weeks. A local sanitary manufacturing interest closed this week for more than 2,000 tons of Nos. 2 and 3 and forge for Louisville this year at $12.50 Birmingham for No. 2 and $11 for the forge. On delivery the remainder of the year on northern iron, we quote as follows:

Bessemer, valley	$14.50 to 14.75
Bessemer, Pittsburg	15.40 to 15.65
No. 1 foundry, Pittsburg	15.60 to 16.10
No. 2 foundry, Pittsburg	15.25 to 15.50
Gray forge, Pittsburg	14.25 to 14.50
Basic, valley	14.00 to 14.25
Basic, Pittsburg	14.90 to 15.15

Ferro-Alloys.—A fair scattering demand for all the ferro-alloys for forward delivery is in evidence. Prices are not especially strong. An inquiry for 150 tons of ferro-manganese for first half is still before sellers. We quote 80 per cent ferro-manganese at $42.50 to $43 Baltimore with the freight rate of $1.95 to Pittsburg.

Imported 50 per cent ferro-silicon is quoted $64 to $64.50 Pittsburg on forward deliveries; domestic 12 per cent, $27; 11 per cent, $26; 10 per cent, $25. These quotations are applicable to Pittsburg territory. Imported lower grades of ferro-silicon are on about the same basis.

Plates.—Beyond a little freer specifying, plate consumers are showing no greater buying movement. There are indications that another small lake freighter may be placed soon. There is considerable shading in plate prices and the active competition for business in some cases has made this of marked proportions. We qoute:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—A fair amount of new

business is being offered in sheets, but the market does not appear to be gaining much strength. Some consumers are promising more extensive buying after the election. At present there are practically no orders for stocking purposes coming to the mills, and quick shipment demands are universal. The cutting of official prices is quite general, and is being done in both black and galvanized grades, although it is more pronounced in the latter. The operations of the leading interest are practically unchanged this week. Some of the independents are running their mills full. We quote:

Blue annealed sheets, No. 10 and heavier, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c; box annealed, Nos. 17 to 21, 2.25c; Nos. 22 to 24, 2.30c; Nos. 25 and 26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.60c; No. 30, 2.70c; galvanized sheets, Nos. 10 and 11, 2.45c; Nos. 12 and 14, 2.55c; Nos. 15 and 16, 2.65c; Nos. 17 to 21, 2.80c; Nos. 22 and 24, 2.95c; Nos. 25 and 26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 3.95c; corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Jobbers are allowed $1 a ton from these prices.

Tin Plate.—Some makers of tin plate, including the American Sheet & Tin Plate Co. and several independents are preparing for more mill activity over the remainder of the year in anticipation of large shipments over the first quarter. A good portion of this tonnage will go to the Pacific coast to the salmon packers, and shipments will start in January. The increase in operations is not expected to be large, as considerable finished product is now in stock. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rail and Track Material.—Some further releases on deferred contracts for standard sections have been received by the Carnegie Steel Co., but there are no definite developments in the way of new buying. Some of the steam roads, however, are expected to come into the market after the election. The week was not particularly active in light rails, about 1,000 tons being booked. The rail mills at the Edgar Thomson works are operating intermittently. The spike market continues one of small sales. On present specifications on Bessemer rails we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—Holders of sliding scale contracts are getting their semi-finished steel at advantageous prices owing to the low quotations prevailing in Bessemer iron. Specifications against billet contracts are fair and in larger volume than those against sheet and tin bars. There is considerable demand for skelp and hoop crop ends for washer stock. We quote:

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

Hoops, Bands and Cotton Ties.—Better specifications against hoop contracts are being received. There is little new buying, but considerable business is expected soon, as many present contracts expire with the end of the year. We quote:

Cotton ties, 87½c per bundle Pittsburg, plus the freight on lots of 3,000 bundles or more, and 90½c per bundle Pittsburg for less than 3,000 bundle lots.

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

Merchant Bars.—Substantial gains in mill orders were enjoyed generally by steel bar makers during October, the tonnage in specifications received being in excess of any other month of the year. One large interest in the month took a larger tonnage in new business for future shipment than its total output during the month. The railroads are specifying more freely for bar iron, the material going to car repair purposes. Some bar iron makers are showing hesitancy in granting extensions on contracts at the present market level. While the competition of the rerollers in steel specialties is still spirited, prices being named are not so low. Prices on bedstead angles from new steel which is an open market, have recently been advanced, and the rerollers have elevated their quotations in accordance. We quote:

Common iron bars, 1.40c Pittsburg in carload lots and over; 1.45c in less than carloads; 1.32c to 1.35c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting 57 per cent in carloads, and 52 per cent less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.60c base. Iron finished tire under 1½ by ½ inches, 1.55c, plus ½ extras on tire card; iron finished tire, 1½ by ½ and over, 1.40c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch thicker, we quote base prices per 100 pounds, $3.35 on hard, and $3.60 on soft.

Structural Material.—A substantial improvement in structural bookings was registered in October, but this month is usually one of activity under normal conditions. The past month was a very good one, comparatively speaking, for the leading fabricating interest, and among some of the larger independents it is reported to have been the best of the year, both from the standpoint of material shipped and new business taken. The inquiry is fair. Fabricating prices are still low. The American Bridge Co. has taken 5,000 tons for bridge and viaduct work for the Santa Fe, a portion of which was a release on a standing contract. The Jones & Laughlin Steel Co. will furnish, fabricate and erect between 800 and 900 tons of steel for the new Y. M. C. A. building at East Liberty. W. N. Kratzer & Co. will fabricate the steel and erect a large addition to the Oil City Boiler Works, Oil City, Pa. Among the projects now taking bids are a power house for the Detroit-Edison Co., Detroit, 1,500 to 2,000 tons, and an extension of the Toledo government building, 1,000 tons. We quote:

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from 3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Merchant Pipe.—The general condition of the merchant pipe market is quite satisfactory. Although the jobbers are still refraining from carrying stocks beyond absolute needs, there is

a steady demand for merchant pipe and considerable business in gas and oil field goods is being placed. Inquiries for between 25 and 30 miles, largely for western shipment, are now in the market. Steel pipe prices are very firm, and any shading in the market is confined to iron pipe. We quote the following official base discounts, with an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
¼ to 6 inches....	75	65	73	63

Boiler Tubes.—Because of the condition of the railroads and industrial plants generally as respects power construction, the boiler tube market is lacking in activity. Buying of locomotive tubes for repair work has moderately increased. We quote the following official base discounts to the general trade on base sizes:

BOILER TUBES.	Iron.	Steel.
2¼ to 5 inches.....	52	65

Wire Products.—Although the manufacturing trade is only fair and jobbers are avoiding stock orders, with the further fact that the present season is normally quiet, the situation in wire products is comparatively healthy. The trade to jobbers is showing more life, and there are evidences that following the election considerable business may be released. Prices are firm. The Youngstown Sheet & Tube Co. will begin to move in December into its practically new plant at Struthers, O., and sometime after the first of the year that company will be a maker of a full line of wire products, including plain, galvanized and barb wire, rods and wire nails. When the company acquired this plant recently, it became a maker of only rods, plain wire and wire nails. We quote:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Wire Rods.—Orders against contracts are moving fairly well, but new business is light. We quote $33 Pittsburg on Bessemer and $34 Pittsburg on open-hearth rods.

Coke.—While the inquiry for furnace coke for next year's delivery is good, but little business has been placed at the asking prices of the operators, $1.90 to $2 for first half. Some furnaces report having closed for their requirements under these prices. Spot coke appears firm around $1.70, the continued drouth in the operating regions adding to its strength. The absence of rainfall continues to handicap oven activity. The total rainfall in Westmoreland county from five showers during the month of October was 0.38 of an inch. Implement makers are specifying heavily for foundry coke. New business is not heavy. Connellsville foundry coke is held from $2 to $2.25 ovens for this year, and $2.35 for first half. Production for the week ending Oct. 24 showed a marked decline, the figures of the *Courier* being 17,427 ovens active, 20,203 ovens inactive, with an output of 188,939 tons compared with 17,621 ovens active, 20,011 ovens inactive, with an output of 198,315 tons the preceding week.

Old Material.—The Pennsylvania railroad is again offering its large accumulation of old rails, which, with the October additions, now reaches about 26,000 tons. In September the lot amounted to 21,670 tons. The company is also asking bids on several thousand tons of other material. The market is holding at about the gait of a number of weeks past and prices are unchanged. Heavy melting stock, closely held by dealers, continues higher in price than basic pig iron. We quote as follows gross tons delivered in the Pittsburg district:

Heavy melting scrap, $14.50 to $15; re-rolling rails, $16 to $16.75; bundled sheet scrap, $12 to $12.50; iron axles, $21 to $21.50; old iron rails, $17 to $18; No. 1 wrought scrap, $16 to $16.50; old car wheels, $14.75 to $15.25; low phosphorus, $18 to $18.50; machine shop turnings, $10.25 to $10.75; cast borings, $9.50 to $10; No. 1 cast scrap, $14 to $14.50; malleable, $14 to $14.50.

British Ore Statistics.—The annual British home office returns, just issued, show that the output of iron ore during 1907 was 15,731,604 tons, valued at £4,433,418, as compared with 15,500,406 tons, valued at £4,085,428 in 1906. These figures show increases of 231,198 tons and £347,990. The ore yielded 5,146,949 tons of pig iron as against 5,040,360 tons in the previous year. Including imports the total quantity of iron ore available for furnaces in the United Kingdom in 1907, exclusive of mill and forge cinders, was 23,928,517 tons, as compared with 23,874,271 tons in 1906.

CHICAGO.

Many New Orders and Much More Business in Sight.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Nov. 3.

The review of the pre-election week shows a continuance of orders and inquiries in good volume despite the undoubted number that have been withheld until next week. A resume of the business placed in the month of October is quite encouraging and decided tonnage increases mark the sales of almost all products. The leading interest received orders for 25,000 tons of steel bars in the month, the tonnage of plates and shapes for car work was unusually large, totaling close to 60,000 tons, the structural tonnage for railroad and building purposes aggregated over 50,000, leaving still unplaced in this territory structural tonnage to almost double that amount. Railroads have specified well on rail contracts, such orders as have been recorded alone amounting to 50,000 tons. The prospect for November gives reason to believe that the steady progress industry has been enjoying will not be interrupted and there is further reason to expect that in the next two weeks a considerable tonnage of accumulated orders will be placed, particularly in pig iron, structural material and railroad equipment.

The Missouri Pacific railroad has placed an order with the American Car & Foundry Co. for the repair of 6,000 freight and 75 passenger cars. The Illinois Central has ordered 400 Hart convertible cars from the Rodger Ballast Car Co. to be built at the Detroit Works of the American Car & Foundry Co. The Chicago, Rock Island & Pacific railway will build new terminal yards, roundhouse and coal chutes at a cost of $200,000 and has let the contract to the Dalhoff Construction Co., of Little Rock, Ark.

During the week, bids were opened on the new city hall and the bridge contracts for Mississippi river bridges were finally let, all of which involves some 24,000 tons. Miscellaneous structural contracts were numerous and widely scattered and it is reported that inquiries are very heavy. Light rail sales were heavy, a single order for 2,500 tons being received. Standard sections were freely specified by the Northern Pacific and the Chicago, Rock Island & Pacific. Other finished lines are very generally improved in activity. Prices are likewise noticeably firmer, though some shading still crops out. Pig iron sales were more numerous and a larger tonnage was sold than for a number of weeks. While the major portion of

the business including a sale of 20,000 tons went to northern furnaces because of relatively low prices, the sales of southern iron were the largest since a premium price has been asked by southern furnaces. The scrap market is strong and prices advanced 25 and 50 cents per ton for several grades of old material.

Pig Iron.—The transaction of largest tonnage in a week of activity involved a sale of 20,000 tons of high phosphorus iron, silicon averaging 2.50 per cent for delivery to a local agricultural implement interest, beginning this year and extending through the first four months of next. The average delivered price, which includes a freight rate of $1.25, will be $16.25. Other buying of iron was well scattered and included among the purchasers the leading radiator company, a local maker of pipe and fittings and several implement interests. Local furnaces fared well, one office selling in the neighborhood of 16,000, in which was a 3,000 ton lot. A great part of the tonnage was made up of lots that were less than 1,000 tons. The price of local iron was pretty well established at $16.50 for this year's delivery and in several instances this price carried over into next year. The asking price for next year has been $17. One southern interest reports sales aggregating 2,000 tons and another about 3,000 tons. A part of this was high silicon and the rest foundry iron. The southern situation is unchanged, the furnaces asking $12.50 Birmingham for No. 2 for the remainder of this year and $13 for next year. There is a large amount of inquiry in the market, among which is one for 5,000 tons of basic, and an inquiry for a smaller lot of charcoal iron. We quote as follows for Chicago delivery:

Lake Superior charcoal	$19.50
Northern foundry No. 1	17.00 to 17.50
Northern foundry No. 2	16.50 to 17.00
Northern foundry No. 3	16.00 to 16.50
Southern foundry No. 1	17.35 to 17.85
Southern foundry No. 2	16.85 to 17.35
Southern foundry No. 3	16.35 to 16.85
Southern foundry No. 4	15.85 to 16.35
Southern No. 1 soft	17.35 to 17.85
Southern No. 2 soft	16.85 to 17.35
Southern gray forge	15.60 to 16.10
Southern mottled	15.35 to 15.60
Southern silveries, 4 per cent silicon	17.85 to 18.35
Southern silveries, 5 per cent silicon	18.35 to 18.85
Southern silveries, 6 per cent silicon	18.85 to 19.35
Jackson Co. silveries, 6 per cent.	19.90
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Jackson Co. silveries, 10 per cent	21.90
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	17.65 to 18.15
Alabama Basic	16.85 to 17.35

Effective Nov. 15, the rate from southern Ohio furnaces to Chicago will be $2.15 instead of $2.40 as at present.

Billets and Rods.—There is more or less intimation that billet prices in this market have not been maintained absolutely. This has not admitted of confirmation, but, with the exception of very small lots of forging billets, there have been no recent transactions other than the sale to the Railway Steel Spring Co. and the Phoenix Horseshoe Co., and these sales have been reported. There is no new information to be reported concerning rods. We quote 4 x 4-inch rolling billets $26.50, and forging billets $28.50 base, Chicago. We quote, f. o. b. Pittsburg, Bessemer wire rods, $33; open-hearth, $35; chain rods, $33.

Merchant Steel.—Specifications on steel bars received by the leading interest during October totaled 18,000 tons, in addition to which 7,000 tons in new business was booked. The bar mills at Bay View are operating practically full. Other manufacturers of steel bars, while rolling somewhat less actively, are receiving specifications regularly. The Inland mill of the Republic Iron & Steel Co. has resumed and two Moline and two Tudor mills are in operation. Miscellaneous forms of steel have been moving less freely in the past week or two. Iron bars have experienced an increased demand due to railroad buying. There are no changes in prices and we quote as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth-finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch, 1.73c base tire card; iron finish, 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1-inch, 2.08c, and 1⅛-inch and larger, 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.05c; toe calk steel, 2.13c; railway spring, 1.93c base steel card; vehicle spring steel, 1.98c base, vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

Plates.—Car orders placed during October supplied a very good tonnage of plates and sufficient to give to October a fair margin over the preceding month. Both the sheared and universal plate mills of the leading interest are operating. Prices appear to be firmer, though shading is encountered, especially on universal plates from eastern independent mills. We quote without change:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal o sheared, 1.78c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 to 96 inches wide, 2.10c to 2.20c; 3/16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 2.15c. Flange and head quality, 25c extra.

Sheets.—Orders for sheets continue to show up well, galvanized being the most active grade, although the trading in blue annealed has improved. The Inland Steel Co., which has been installing an additional galvanizing pot, will put it into service this week. This will add 50 per cent to the present capacity. Prices have assumed a firmer tone. We quote prices from store as follows:

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, No. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—The general contractor's bids for the new Chicago city hall were opened today and the low bidder was the Noel Steel Construction Co., of Baltimore, Md., with a bid of $3,295,000. It is understood that there will be a disposition to favor a local contractor. The next three bidders were such, being the Alling Construction Co., Thompson-Starrett & Co., and John Griffith & Sons, with bids of $3,333,333, $3,373,000, $3,436,000 respectively. The Wm. Grace Co., which built the new county building, very similar in construction to that proposed for the city hall, entered a bid of $3,524,000. The high bid was that of the Geo. W. Jackson Co., Inc., $4,499,940.60. The letting of the Hart-Shaffner-Marx building, which was scheduled for today, has been postponed for the preparation of alternate figures on a reinforced concrete building. In the concrete design, the steel floor girders will be retained and the tonnage of steel will

be reduced only about one-third. It is understood that arrangements have been made whereby the American Bridge Co. will fabricate the 4,100 tons of steel for the Northwestern terminal building under sub-contract from Geo. A. Fuller Co. It has been stated authoritatively that the contracts for the McKinley and Keithsburg bridges on the Mississippi have finally been awarded to the Pennsylvania Steel Co. and the McClintic-Marshall Construction Co. respectively as first reported in THE IRON TRADE REVIEW. The McClintic-Marshall Construction Co. will also furnish about 900 tons of steel for the new foundry of the American Car & Foundry Co., St. Louis. The contract for 519 tons for the Dry Goods Reporter Bldg., Chicago, went to the Morava Construction Co. The American Bridge Co. took orders for 255 tons for a warehouse for John E. Dooley at Salt Lake City, and about 155 tons for a flume trestle for the Utah-Idaho Sugar Co., and an addition to the bag house of the Bingham Junction works of the United States Smelting Co. Contracts for four bridges in California, two in San Joaquim county and two in San Bernardino county, were placed, the work going to the Bellefontaine Bridge Co., Bellefontaine, O.; the Clinton Bridge Co., Clinton, Ia.; the Union Iron Works, Los Angeles, Cal.; and C. G. Sheeley, contractor, who buys his steel from the American Bridge Co. The tonnage on all was very small. The Minneapolis Steel & Machinery Co. will fabricate 100 tons for a power house for the Bisbee-Naco Water Co. (Arizona) and 110 tons for a hotel building in Denver. Six steel grain tanks for the El Paso Grain Co., requiring 100 tons of steel, will be made by the El Paso Foundry Co. The structural situation from a tonnage standpoint looks very good and inquiries are continually increasing in number. Prices, if anything, are better. We quote for Chicago delivery on plain structurals as follows:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The Northern Pacific railroad specified 12,000 tons of rails on its contract with the Lackawanna Steel Co. last week and the Chicago, Rock Island & Pacific released 5,000 tons to the leading interest. The light rail business for the month of October was more than anticipated and close to 8,000 tons were booked. An order for 2,500 tons was received last week from a Texas lumber company. The light rail mill at South Chicago is again running. Specifications on spike and bolt contracts are in very fair volume, but other lines of track supplies are inactive. The purchase of some special track work contemplated by the Chicago City Railway Co. has been postponed, probably until after the first of the year. The leading interest closed with a Michigan traction interest for 3,800 tons of heavy traction rails and has contingent upon the election another order for 2,500 tons. Prices are about the same and we quote as follows:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $26; 20-pound, $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.20c; with hexagon nuts, 2.25c to 2.35c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Merchant Pipe and Boiler Tubes.—The volume of business in tubular goods has remained practically stationary during the past three months, despite the generally improved character of trade. The demand for boiler tubes is the most likely feature and very prompt shipment is usually asked for every order. We are unable to confirm the reports of price shading on tubes and quote as follows:

	—Steel—	
	Black.	Galv.
¼ to 6 inches, inclusive.....	73.2	63.2
7 to 12 inches, inclusive.....	70.2	55.2

BOILER TUBES.

	Steel.	Iron.	less.
2¼ to 5 in., inclusive....	63.2	50.2	50.2

Cast Iron Pipe.—The market was fairly active last week, with inquiries and a number of small lettings. Routine inquiries came in as usual. The contract for 3,500 tons of pipe for the city of Helena, Mont., was let. This is for a municipal water works, but before the installation of this plant can be assured bonds must be sold and the present private company operating the water system must be ousted. The city of Detroit will probably be in the market for about 2,000 tons of pipe in the middle of the month. We quote for 4-inch pipe, $27; 6 to 16-inch, $26; larger sizes, $25. Gas pipe, $1 a ton higher.

Wire Products.—In all branches of the wire trade, plain and barb wire and nails, a very gratifying volume of business has developed from month to month almost without a slump. The situation continues to promise well for the future. Prices are without change and we quote as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Old Material.—The local scrap market acquired increased strength during the past week and prices are still higher. There is comparatively little scrap coming into the market and that which is in stock is being offered for consumption very slowly. No. 1 wrought from one of the railroad lists of last week was sold to a manufacturer of iron bars for $14.40 Chicago, and the same road disposed of angle bars at $17. A moderate tonnage of relaying rails brought $23. An assortment of 2,000 tons of scrap was bought for an East Chicago mill during the week. Heavy melting steel is in demand, with but little offered. The local market has already begun to speculate on the probable influence in this territory and elsewhere of the open-hearth operations at Gary. This plant will require a large tonnage of steel scrap. The only list of the week is one issued by the Chicago & Northwestern Ry. for 2,000 tons. Practically all of the tonnage offered last week was bought up. We have revised our prices and quote as follows, gross tons in the first paragraph:

Old car wheels	$15.25 to 15.75
Old iron rails	18.00 to 18.50
Re-rolling rails (4 ft. and over)	16.25 to 16.75
Old steel rails (4 ft. and under)	14.75 to 15.25
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	14.25 to 14.75
Heavy melting steel	14.50 to 15.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.25 to 14.75
No. 2 R. R. wrought	12.75 to 13.25
Knuckles, couplers and springs	13.25 to 13.75
Shafting	16.50 to 17.00
Iron car axles	20.00 to 20.50
Steel car axles	17.75 to 18.25
Dealers' forge No. 1	11.00 to 11.50
Pipes and flues	10.25 to 10.75
No. 1 cast, 150 lbs. and less	13.50 to 14.00
No. 1 mill	8.00 to 8.50
Mixed busheling (Nos. 1 and 2)	8.25 to 8.75
Country sheet	5.50 to 6.00
No. 1 boiler cut	8.50 to 9.00
Boiler punchings	11.50 to 12.00
Cast borings	6.50 to 7.00
Mixed borings, etc	6.50 to 7.00
Machine shop turnings	7.50 to 8.00
Railroad malleable	12.75 to 13.25
Agricultural malleable	11.50 to 12.00
Stove plate and light cast scrap	12.00 to 12.50
Old iron splice bars	17.00 to 17.50

The puddling department of Moorehead Bros. & Co., at Sharpsburg, Pa., resumed operations the past week

CLEVELAND.

Activity in Pig Iron—Some Orders Depend on Election Results.

Office of THE IRON TRADE REVIEW, Browning Building, Nov. 3.

Iron Ore.—Reports of ore shipments for October show a surprising increase, the total being 5,099,110 tons, a gain of more than 400,000 tons over September, but, of course, a heavy loss compared with October, 1907. Shipments up to Nov. 1 show a decrease of 15,311,789 tons, compared with the same period in 1907. This season's shipments to Nov. 1 amounted to 21,730,072 tons, and the prospect is that the shipments for the season will be nearly 25,000,000 tons.

On base ores, with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—A very decided change has taken place in the pig iron market. Instead of the quiet which has prevailed for a long time, there is widespread interest, and sales of about 25,000 tons of foundry grades, distributed among many melters, have been made. A Massillon pipe interest is in the market for 27,000 tons, the order to be placed Wednesday providing election results are favorable. Other sales depend upon the outcome of the election. Prices of foundry grades are firmer, and Cleveland interests are selling at $15.50 for delivery in Cleveland, and $15 for delivery outside of the city. Basic and malleable are also very much more active. An offer of $14.25 for 1,000 tons of basic was promptly declined.

Buying has been for the last two months of the year and first quarter and first half of next year, but sellers of all grades are conservative and not disposed to sell for advanced delivery. The Massillon inquiry is expected to attract a number of sales representatives to that city Wednesday. We quote f. o. b. Cleveland for delivery in the city, as follows:

Bessemer	$15.50 to 15.90
No. 1 foundry	15.40 to 15.80
No. 2 foundry	15.25 to 15.50
No. 3 foundry	14.90 to 15.25
No. 2 southern	16.85
Gray forge	14.00 to 14.50
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—There is much more interest in the market, and prices are firmer, with sellers not disposed to contract at present quotations. We quote spot furnace coke at $1.80 to $1.90, and on shipments for the remainder of the year $1.90 to $2. Foundry coke we quote at $2.25 for prompt delivery and $2.50 on contracts.

Finished Material.—The market is extremely quiet, but increased activity is expected the latter part of the year, as buyers seem to be hesitating on account of political considerations.

Old Material.—The market is firm, especally for turnings and borings, and there is a general disposition on the part of both buyers and sellers to wait until after the election; hence, transactions are few. We quote, f. o. b. Cleveland, as follows:

Old iron rails	$17.00 to 17.50
Old steel rails (re-rolling)	15.50 to 16.00
Old steel rails (under 6 ft.)	15.50 to 16.00
Old car wheels	15.00 to 15.50
Old steel boiler plate	12.50 to 13.00
Steel axles	18.50 to 19.00
Malleable iron (railroad)	13.50 to 14.00
Malleable iron (agricultural)	12.00 to 12.50
Heavy steeel	13.75 to 14.25
Country mixed steel	12.00 to 12.50
Low phosphorus	16.00 to 16.50

We quote net tons as follows:

No. 1 R. R. wrought	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.00 to 13.00
Iron axles	17.00 to 18.00
Axle turnings	9.50 to 10.00
Machine shop turnings	8.00 to 8.50
Grate bars	11.00 to 11.50
Pipes and flues	11.00 to 11.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 8.50
Sheet iron	6.00 to 6.50
Wrought drillings	8.00 to 8.50
Stove plate	11.00 to 11.50
Cast borings	7.00 to 7.50

CINCINNATI.

Active Buying Started—Large Tonnage of Pig Disposed of.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Nov. 3.

Pig Iron.—A buying movement has taken place and in this territory some large purchases have been made and Cincinnati agencies have sold in the past few days about 50,000 tons of pig iron of foundry grades. There are a number of inquiries, the most important of which is from a northern Ohio pipe maker for 27,000 tons for first half delivery, divided equally between No. 2, No. 3 and No. 4 foundry. Basic inquiry is active and some good tonnages have been sold. One 5,000-ton lot was sold by a northern furnace to a St. Louis melter. An Ohio manufacturer has closel for 3,000 tons of malleable for delivery in the second quarter of next year, at $14.75, Ironton. An inquiry for 5,000 tons of basic, 2,000 tons for delivery this year and 3,000 for first quarter of next year, is under consideration. A central Ohio manufacturer closed for 1,000 tons of foundry iron for first half delivery. A number of transactions are not reported, but agencies advise they have booked orders ranging from 500 tons to 10,000 tons, without furnishing more specific information. A large part of the southern foundry iron sold has gone at $12.50, Birmingham, and this price has been accepted for deliveries into the first quarter of next year. Some of the furnace interests have now withdrawn the quotation so far as next year is concerned, and it is doubtful whether anything below $13, Birmingham, for first quarter can be done. Northern iron continues to sell at $14.75, Ironton, for No. 2 foundry and malleable. There is a decidedly firmer feeling and selling agents are more inclined to advise purchasing. We quote for prompt shipment and for the remainder of the year, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.10 from Ironton, as follows:

Southern foundry No. 1	$16.25 to 16.75
Southern foundry No. 2	15.75 to 16.25
Southern foundry No. 3	15.25 to 15.75
Southern foundry No. 4	14.75 to 15.25
Southern No. 1 soft	16.25 to 16.75
Southern No. 2 soft	15.75 to 16.25
Southern gray forge	14.25 to 14.50
Northern No. 1 foundry	16.35 to 16.85
Northern No. 2 foundry	15.85 to 16.10
Northern No. 3 foundry	15.35 to 15.60
Northern 8 per cent silicon	19.60

Finished Material.—The situation is not materially changed and specifications on contracts have been fairly good the past week. The jobbing trade is steady and small orders are filled here at the following prices:

Iron and steel bars, 1.85c to 2c, full extras. Angles, 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3/16-inch, 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c, and No. 28, 2.85c to 2.95c; boiler tubes, 2¾ to 5 inches, 62 per cent off base; turn-buckles, 45 per cent off; rivets, 3c base; cold rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

Coke.—Prices remain unchanged with sales mainly confined to prompt shipment coke, which is selling at previous quotations. Buyers are not seriously considering their next year requirements as yet and the supply of coke at the ovens is ample. Reasonably prompt deliveries are readily obtainable. Prices in the leading coke producing districts are as follows:

	PER TON.
Wise county furnace coke	$1.75 to 1.85
Wise county foundry coke	2.10 to 2.25
Pocahontas furnace coke	1.60 to 1.75
Pocahontas foundry coke	2.00 to 2.25

Standard Connellsville furnace coke	1.75 to 1.80
Standard Connellsville foundry coke	2.00 to 2.25
Connellsville district furnace coke.	1.60 to 1.65
Connellsville district foundry coke.	2.00 to 2.25

Old Material.—The market is firm with dealers asking strong prices for their yard stocks. Quotations in some instances are higher than a week ago. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$13.00 to 13.50
No. 1 machinery, net tons	13.50 to 14.00
Old iron rails, gross tons	15.00 to 16.00
Old steel rails (re-rolling) gross tons	15.50 to 16.00
Old short lengths, gross tons	14.50 to 15.00
Old iron axles, net tons	17.00 to 18.00
Heavy melting scrap, gross tons	13.00 to 13.50
Stove plate, net tons	10.00 to 10.50
Wrought turnings	6.00 to 7.00
Cast borings, net tons	4.50 to 5.00
Car wheels, gross tons	14.00 to 14.50

NEW YORK.

Increasing Activity in Foundry Pig Iron—Many Structural Contracts.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Nov. 3.

Pig Iron.—The demand for basic and malleable having been largely met by the heavy transactions of a fortnight ago, the center of activity has now shifted to foundry iron, on which the market is increasingly strong. During the past week, the proximity of the elections has apparently done nothing to decrease the number of melters eager to place for their requirements through the first quarter and, in many cases, through the entire first half. The hand-to-mouth buying program adhered to by the bulk of consumers for months past has naturally resulted in their yards becoming practically bare, and now that the melt is increasing, with every prospect of its continued improvement, many insistent calls for prompt shipment are going to the furnaces. The trade seemingly has made up its mind that pig iron prices are not going lower; in fact, it is pretty generally of the opinion that advancing prices will be the rule through the winter. This view is shared by the producers, who are demanding considerably higher figures on iron for shipment later than March, and are not soliciting business at all for that delivery. The International Steam Pump inquiry, calling for shipments through 1909, was quoted on by only a few interests and not placed. A good many consumers are accepting early and last quarter shipment on iron which will not be melted until next year. A feature of the increased activity is the bringing out of inquiries which will probably result in the early sale of good tonnages of southern iron at points not in competition with northern irons. There have been a few unimportant price changes, but generally the level continues as heretofore. On a lot of 3,000 tons of 2X foundry, purchased by a Connecticut melter, the price was $17, delivered, both for prompt shipment and delivery running to the end of the year. The $16, eastern furnace, level is still being shaded here and there. Virginia irons show a wide spread, prices ranging from $15 down as low as $13.50. The tidewater quotations given below are for shipment prior to Jan. 1:

Northern foundry No. 1	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	15.75 to 16.25
No. 2 southern foundry	16.75 to 17.25
Malleable	17.00 to 17.50
Basic	15.75 to 16.25
Gray forge	15.50 to 16.00

Ferro-alloys.—Inquiries are current for one lot of 500 tons, delivery through the first half, and for a lot of from 1,200 to 1,500 tons for shipment throughout next year. No large sales have been reported since that of 1,200 tons to an Ohio steel plant a fortnight ago, and the price remains about $43, seaboard. Ferro-silicon is not active.

Finished Materials.—October bookings of the American Bridge Co. were about 18,000 tons, as neither the orders for the Northwestern station at Chicago, 4,100 tons, and its approaches, 24,000 tons, nor the contract for the Belnord apartments in New York, 8,000 tons, were received in time for October listing. During the final week, the bulk of orders went to independent interests, which landed over 25,000 tons of scattered contracts. The Brown-Ketcham Iron Works, for instance, secured a 970-ton office building in New York, 1,875 tons for the Carnegie Central library at St. Louis, a 500-ton office building at San Antonio, and 1,350 tons for the St. Louis postoffice. The Cincinnati Southern viaduct, 2,550 tons, went to the Riter-Conley Mfg. Co.; a mill building for the Wisconsin Steel Co., 330 tons, was taken by the McClintic-Marshall Construction Co., and the First National Bank building at Pittsburg, 4,200 tons, went to the Pittsburg Steel Construction Co. Other miscellaneous lettings include: The eight-track sanitary system bridge at Chicago, 4,200 tons, to the Chicago Bridge & Iron Co.; a 400-ton boiler shop for the Oil City Boiler Works to W. N. Kratzer & Co.; a 400-ton gymnasium at Salt Lake City to Silver Bros., of that city; 520 tons in the Dry Goods Reporter building at Chicago to the Moravia Construction Co.; and 800 tons of plain materials for the Twin City Rapid Transit Co., St. Paul, which will do its own fabricating. The receivers of Milliken Bros., Inc., have secured a 250-ton order for a smelting house of the American Smelting & Refining Co., at Perth Amboy, N. J. They will also supply 1,000 steel transmission towers for the Southern Power Co., Charlotte, N. C., and the order will probably be doubled, thus involving about 4,000 tons of steel. The Stock Quotation Telegraph building, New York City, about 900 tons, went to the Eastern Steel Co. The 1,100 tons required for the Empire building at Birmingham will be fabricated by the Noelke-Richards Iron Works, Indianapolis.

In projected work a large tonnage is involved. New York engineers are preparing plans for 200 small steel railway bridges for a South American line. Specifications for the steel shed on Pier 53 are being delayed by uncertainty as to the fire-fighting system to be installed. Bids have been opened on the Chicago City Hall building, involving over 11,000 tons, and tenders are in on a 1,700-ton bridge approach at St. Louis. An early award is expected on the Long Beach hotel, 1,000 tons, and on several other projects previously mentioned.

We note the sale of 2,000 tons of special billets by the Pennsylvania Steel Co., and of some smaller lots of standard billets, all at full prices. About 1,200 tons of rail orders have been taken by the Pennsylvania Steel Co. The Lukens Iron & Steel Co. will supply 100 tons of plates for the boilers and 600 tons for the hulls of two steel freighters to be built for the Vermont Central by the Harlan & Hollingsworth Co. at Wilmington. The steel trade shows a brisk improvement, export trade being particularly good. Structural steel prices are tending upward. Bar iron continues weak, some mills tributary to New York selling as low as 1.35c at the mill. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.41c to 1.51c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

Old Materials.—Wrought pipe and turnings and cast borings are in moderate demand, otherwise the list is not active. Stocks in yards are low, and not much scrap is being accumu-

lated. Wrought pipe is slightly higher. We quote, gross tons, New York delivery, as follows:

Old steel rails, re-rolling	14.00 to 14.50
Relaying rails	20.50 to 21.50
Old car wheels	13.50 to 14.00
Old iron car axles	18.00 to 18.50
Old steel car axles	17.00 to 17.50
Heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
Iron track scrap	12.50 to 13.00
Wrought pipe	11.00 to 11.50
Cast borings	8.00 to 8.50
Wrought turnings	9.00 to 9.50
Heavy cast scrap	13.00 to 13.50
Railroad malleable	13.00 to 13.50
Stove plate	10.50 to 11.00
Grate bars	10.50 to 11.00

PHILADELPHIA.

Many Inquiries for Pig Iron and Some Sales—Sellers Conservative.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Nov. 3.

Pig Iron.—Still further discounting the election and in anticipation of a sudden rise in prices thereafter, buyers have sent down a shower of inquiries and orders on the furnace men within the past week. Numerous sales have followed, but owing to the conservative attitude of the sellers, they have been mostly for small tonnages, furnace men being disposed to await a determination of the political factor involved. Many of the instances where orders have been booked, especially for larger amounts, proved to be cases where it was more an act of grace, or favor, to some specially friendly buyer. In one case an option until Wednesday at present prices was given on about 2,000 tons of foundry iron. In another, an order is held, unbooked, contingent upon the election of Taft. Generally, however, the sellers are waiting. Prices remain firm, but a change is to be expected following the election. Some Virginia interests are asking figures above those quoted herewith. The Baldwin Locomotive Works, which recently inquired for about 4,000 tons, has purchased for its present requirements. We quote as follows, delivered buyer's yard, eastern Pennsylvania and surrounding territory:

No. 1X foundry	$17.25 to 17.75
No. 2X foundry	16.75 to 17.25
No. 2 plain	16.25 to 16.75
Standard gray forge	15.50 to 16.00
Basic	16.00 to 16.50
Low phosphorus	20.00 to 21.00
No. 2 Birmingham	17.25 to 17.75
No. 2X Virginia	17.00 to 17.25
No. 2 plain Virginia	16.50 to 16.75

Finished Materials.—The market has displayed some little increased activity during the past week. A railroad interest has placed orders in this territory for about 3,000 tons of plates. We quote as follows: Structural, 1.75c to 1.90c; plates, 1.75c to 1.80c; refined iron bars, 1.45c to 1.50c; steel bars, 1.55c.

Old Materials.—There has been practically no change in the market since last week, though prices are firmer. Dealers are holding for better prices after the election. We quote as follows:

Old steel rails (re-rolling)	$17.00 to 17.50
No. 1 steel scrap	15.00 to 15.50
Old steel axles	21.00 to 22.00
Old iron axles	22.50 to 23.50
Old iron rails	19.00 to 19.50
Old car wheels	15.25 to 15.75
Choice scrap R. R. No. 1 wrought	18.25 to 18.75
No. 1 yard scrap	16.00 to 17.00
Machinery scrap	15.00 to 15.50
Low phosphorus scrap	18.50 to 19.00
Wrought iron pipe	14.25 to 14.75
No. 1 forge fire scrap	13.50 to 14.00
No. 2 forge fire scrap, ordinary	9.00 to 10.00
Wrought turnings	12 50 to 13.00
Axle turnings, heavy	12.75 to 13.25
Cast borings	11.75 to 12.25
Stove plates	13.00 to 13.50

ST. LOUIS.

Sales of Basic and Foundry Iron—Market Much More Lively.

Nov. 3.

Pig Iron.—The pig iron market was much livelier in the St. Louis territory last week than it has been for some time. Quite a number of orders were booked both for immediate and future shipment. Scullin & Gallagher purchased 5,000 tons of basic. One order for 2,000 tons of Ohio iron was placed for shipment over the first four months of 1909, and another order for 1,000 tons of southern iron was placed for shipment over the remainder of the present year. Inquiries are out for 3,000 to 4,000 tons of southern iron, about 1,500 tons of northern iron and 1,000 tons of malleable Bessemer. All of these probably will be closed during the present week. There is still some iron to be had at $12.50 for No. 2 Birmingham, but a majority of the furnaces have withdrawn this price and are standing firm at $13. The minimum quotation for the first quarter and half of next year is $13, Birmingham, for No. 2, with some furnaces asking an advance of 50 cents. One or two furnaces positively refuse to quote for delivery next year. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$16.75 to 17.25
No. 2 southern	16.25 to 16.75
No. 3 southern	15.75 to 16.25
No. 4 southern	15.25 to 15.75

No material change in the prices of coke for immediate delivery has taken place since last report from St. Louis, but quotations on contracts are firmer. The best-selected Connellsville 72-hour foundry coke is still held at $2.25, ovens, for prompt shipment, and at $2.50 to $2.75 on contracts. Some high-sulphur grades are quoted as low as $2 ovens. Connellsville 48-hour coke is quoted at $1.50 to $1.75 for immediate shipment, and at $1.85 to $2 for contract delivery. Virginia 72-hour foundry for shipment over the remainder of the year is bringing $2.25 ovens, and $2.50 on contract for shipment over the first half of 1909. The freight rate from Connellsville and the Virginia fields is $2.80 to East St. Louis and St. Louis, and $2.70 from the Virginia fields when destined beyond St. Louis.

Old Material.—Scrap iron quotations are as follows for the St. Louis market:

Cast iron borings, free from foreign material, net ton	$ 6.00
Steel axle turnings, gross ton	12.25
Steel railroad axles, net ton	$17.50 to 18.50
Iron railroad axles, net ton	19.00 to 20.00
Miscellaneous steel scrap, gross ton	12.25
Old car wheels, gross ton	15.00 to 16.00
No. 1 railroad cast scrap, net ton	12.00 to 12.50
Heavy machinery cast, net ton	13.00
Stove plate and light cast, net ton	11.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net ton	12.00 to 13.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	11.50 to 12.00

BUFFALO.

Tone of Market Improved, but Some Shading in Pig Iron.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Nov. 3.

Pig Iron.—The general tone of the market is improved and the outlook is considered good by producer and consumer, but although the trend of things has been toward a betterment, it has not been sufficient to define quotations on a solid basis or to warrant offerings at any stated prices for next year's delivery. It is believed at furnaces and foundries that prices will be more clearly defined, at a very early date, than they are at present and that the movement of iron will be largely increased. Sales have picked up the past week, also inquiries on future deliveries and prompt shipments. The prices quoted below may appear a trifle high at first glance, as foundry grades are selling in certain cases at prices more mellow than those given here. But in this territory certain furnace interests have sold up covering the remainder of the year, and others, who now have offerings, are meeting, as stated, some business from the foundries at shaded prices, owing to the present unsettled conditions. For instance, No. 2X foundry quoted at $15.50 to $16.00 on general business, has sold in a number of cases in this territory within the past week at from $15.00 to $15.50 for early delivery. It is improbable, so it is stated here, that prices on foundry iron will remain long on this basis, but a good

deal of business has been placed within the past week at these prices. We quote for future delivery, f. o b. Buffalo, as follows:

No. IX foundry	$16.00 to 16.50
No. 2X foundry	15.50 to 16.00
No. 2 plain	15.00 to 15.50
No. 3 foundry	15.00 to 15.50
Malleable Bessemer	16.00 to 17.30
Gray forge	14.75 to 15.25
Charcoal	20.25 to 20.75

Finished Products.—Aside from a large steel rail order awarded the Lackawanna Steel Co. by the Northern Pacific railroad, and which is mentioned elsewhere, the market for finished material in this territory seems to be more depressed by reason of the presidential election being close at hand, than other lines. The people representing the mills say there is good business in sight, but it is impossible to close the business while the political conditions of the country are unsettled. The result of this unsettled condition, as generally reported in the Buffalo district, has caused a falling off during the month of October of 25 per cent of the finished product business, besides a marked delay in negotiations on future business, especially where large orders are involved.

BIRMINGHAM.

Production is Improving and Prospects are Encouraging.

Nov. 2.

The turning point in the pig iron market in the south has been reached and there is a better feeling to be noted, though the sales are still coming in in small bits. The inquiry, however, is more active and the fact that the election is a thing of the past promises to bring about that steady improvement that has been so long looked for.

The production in this district is still improving. The little Williamson furnace in this city, which was recently leased by H. L. Wilson and associates, is making iron now. If this furnace, which can produce less than 90 tons of iron a day, will be profitable in operation, the question is presented why will it not be profitable to get as many of the larger furnaces in condition as possible?

There has been no change in iron quotations, $12.50 to $13 per ton, No. 2 foundry, still being in vogue.

A better demand for steel products is also reported and it is expected that by the middle of this month every department of the big steel plant at Ensley (Tennessee Coal, Iron & Railroad Co.) will have been put back on full time with a full complement of men in each department. Announcement is made that some healthy orders for steel rail have recently been placed in this section.

Cast iron pipe manufacturers are making bids on some very large orders and it is announced that if the same are secured, there will be steady operation for the plants here for many months. Orders in Nashville, Tenn., Milwaukee, Detroit, Los Angeles, San Francisco and other places are being bid on by southern pipe makers. The Dimmick Pipe Co. is making delivery now on a fair order from Detroit, Mich., for some 48-inch cast iron pipe.

SEATTLE.

Foundry Conditions Show Improvement—New Railroad Rates.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Oct. 30.

Pig Iron.—The foundry outlook is growing better and consequently the pig iron market on the Pacific coast is improving and the last 10 days have shown a somewhat better record than the almost complete stagnation that characterized the first half of October. Orders for castings in the Puget Sound and Portland territory aggregated over 1,200 tons since Oct. 15, most of which has been placed recently. One order for 450 tons of building castings for the Crane Co.'s wire house at Portland was placed with a Portland foundry a few days ago. This improvement in the foundry melt will eventually have its effect on the demand for pig iron, and its influence is already felt in the more cheerful tone of the local pig iron market. The contemplated adjustment of railroad rates now scheduled to take effect Dec. 1 may force a revision of pig iron prices in the near future. Definite information on what will be done with through rates from the east is not yet available, but it is conceded that there will be a sharp advance in local rates, the knowledge of which should encourage buying during the coming month. We continue to quote:

English soft No. 1 spot	$26.50 to 27.00
English soft No. 1 to arrive Nov.-Dec.	24.00 to 24.50
Glengarnock No. 1, spot	28.00 to 29.00
Southern soft, No. 2	25.70 to 26.20

Old Material.—Improved foundry conditions are having their effect on the scrap market and sales are freer, but it is the opinion of the buyers that prices are high enough at present and any attempts at an increase are met with resistance. The demand for wrought and rolled iron is still insignificant. We continue to quote:

Foundry and machinery scrap	$16.00 to 18.00
Old steel rails	8.00 to 9.50
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.00 to 7.00

Merchant Iron.—While no large orders have been booked during the past week, the demand for rolled stock is being maintained in very good shape. Local rolling mills are again operating on fair schedules with prospects of increasing their output as soon as the political atmosphere clears. Prices, on the whole, are satisfactory and there is little disposition to cut. We quote base prices per 100 pounds, Seattle: Common iron bars, $2.25; soft steel bars, $2.35; machinery steel, $2.75; Norway iron, $3.50; angles, channels, zees and tees, less than 3-inch, $2.75.

BRITISH IRON MARKET.

Pig Iron is Weaker—Shipments are Poor

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Oct. 24.

A downward tendency appears to have set in in the pig iron market, almost all descriptions being decidedly easier in price. The Cleveland quotation is down to 48s 9d ($11.92) for No. 3, which is only 9d above the worst figure of the year. Shipments are poor, and stocks continue to increase, yesterday's record being 87,811 tons. The news of the collapse of the German syndicate has further depressed a market already wanting backbone. Cleveland warrants are 48s 6d ($11.86) a fall of 6d on the week. Buyers are once more manifesting shyness with regard to future contracts. Hematite is maintaining greater firmness apparently on account of the slight improvement in steel. The weakness was very manifest at the Birmingham meeting on Thursday when Northampton and Staffordshire iron were both slightly cheaper. There was irregularity, however, as some furnaces are sufficiently well off to do without orders for some weeks, but others are wanting business and were quite willing to book orders at 1s to 1s 6d below recent figures. The Staffordshire quotation for forge is about 46s ($11.26). Foundry varieties are a shade stronger, the requirements of foundries being distinctly better than those of forges, but in no department is the outlook considered cheerful.

METAL MARKET

CHICAGO.

Nov. 3.

Copper metal has been bought quite freely during the week both for prompt shipment and future delivery as far ahead as February. Prices are stronger and further advances are anticipated. The visible supply of tin this week is about 1,000 tons short of expectations and the market is up in consequence. Lead also

has advanced. We have revised our prices and quote as follows:

Lake copper, carload lots, 14½c; casting, carload lots, 14c; pig tin, 33 to 33½c; spelter, 4.90c to 5c; pig lead, desilverized, 4.50c to 4.55c in 50-ton lots; corroding, 4.90c to 5.00c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c, list f. o. b. La Salle in car lots of 600-pound flasks; Cookson's antimony, 10c to 10½c; other grades, 10c.

Trading in old metals was somewhat brisker during the latter part of the week. Prices have advanced fractionally in sympathy with the metal market and still higher prices are looked for. We quote to dealers:

Copper wire, 12c to 12¼c; heavy copper, 12c; light copper, 11c; heavy red brass, 11¼c; heavy yellow brass, 8¾c; light brass, 6¾c; No. 1 red brass borings, 9c; No. 1 yellow brass borings, 7¾c; brass clippings, 8¾c; tea lead, 3½c; lead scrap, 3¾c; zinc, 3.10c; tin pipe, 24c; tin foil, 23c; pewter, 17c; electrotype plates, free from wood, 4⅛c; electrotype dross, 2⅞c; stereotype plates, 4½c; stereotype dross, 2⅞c; prime slab zinc dross, $55 per ton.

ST. LOUIS.

Nov. 3.

Lead and Zinc.—Last week was marked by a healthy increase and a general emptying of bins in the Missouri-Kansas lead and zinc belt, with prices as follows: Zinc, $36 for 60 per cent ore; lead, $54.50 for 80 per cent ore; silicate, $18 for 40 per cent ore. The United Zinc Co. disposed of its output from the Badger-Peacock district, aggregating nearly three-quarters of a million pounds of zinc. The highest price reported to have been paid for zinc was $39.50 in the Webb City camp on an assay base price of $36.50, a few bins selling for $37. Buyers succeeded in getting zinc for $35.

The lead market strengthened suddenly, and the bulk of the ore sold for $54.50 a ton, as against $52.50 for the previous week. The Webb City camp reported the highest price paid for lead, $55 a ton, and one of the heavy producers offered $56 late in the week, which was declined. Silicate was a little firmer, the prevailing base price being $18. The highest price reported was $26.25 on an assay base of $18 for 40 per cent zinc.

RECENT CUSTOMS DECISIONS.

Steel crank axles, piston rods, crank shafts, crank pins, cross heads and connecting rods produced by a forging process and subsequently manipulated by machining, but not wholly finished or ready for use, are dutiable as "forgings" as 35 per cent under paragraph 127 and not as manufactured articles composed of steel at 45 per cent under paragraph 193 of the tariff. The board of general appraisers held as noted and sustained the protests of Thomas Prosser & Son, New York.

That cold rolled steel strips not blued, brightened, tempered or polished better than the grade "cold rolled, smoothed only" are exempt from 1 cent per pound additional duty under paragraph 141, was held by the board in protests of Hermann Boker & Co., George Nash Co., J. Wilckes Co., New York.

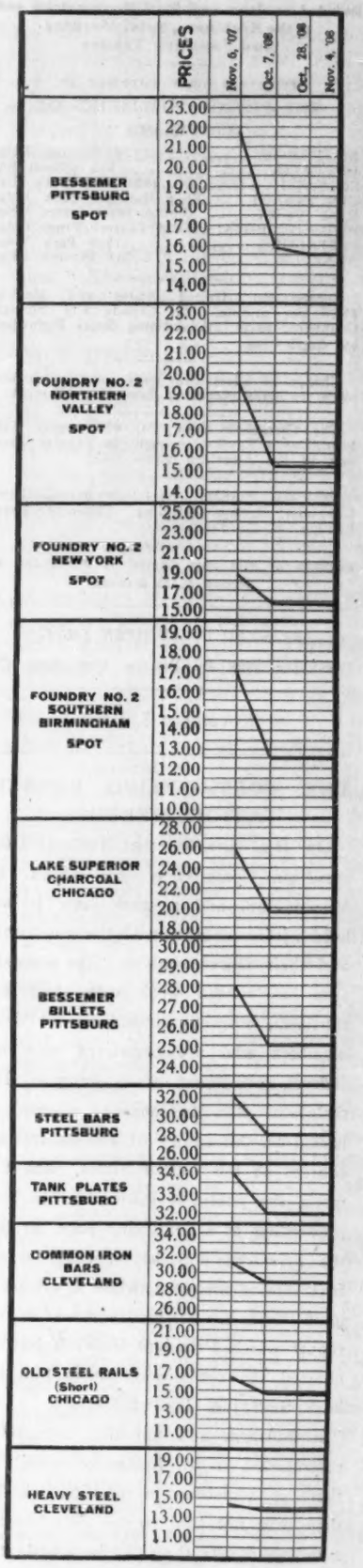
Steel hoods or bowls for cream separator machinery made from the pressing from a sheet or plate of steel and coated with tin are dutiable at 4.7 cents per pound under paragraph 135 as "pressed, sheared or stamped steel shapes." The assessment on the merchandise at 45 per cent was reversed by the board in protests of F. J. Arend, New York.

Material for welding in the form of powder and plates which is fused into a wire mesh is dutiable at 45 per cent as articles manufactured from metal, according to a ruling made by the board of general appraisers.

The board of general appraisers held in protests of United States Metal Box Corner Co., that strip steel coated with tin is dutiable at 45 per cent under paragraph 137 of the tariff and not as steel in all forms and shapes under paragraph 135. The board notes that in the case of United States vs. Boker, decided by the court of appeals, such merchandise was not before the court. It is of the opinion, therefore, that the rate of duty complained of should be affirmed.

Crucible Steel Officers.—At a meeting of the board of directors of the Crucible Steel Co. of America the following officers were elected: Wm. G. Park, chairman of the executive committee; Frank B. Smith, president, Reuben Miller, Herbert DuPuy, John A. Sutton and C. G. Ramsey, vice presidents; Alexander Thomas, secretary; Chas. W. Rowlands, assistant secretary; Julius Bieler, treasurer; A. A. H. Niebaum, assistant treasurer; Geo. A. Turville, comptroller. Executive committee—Wm. G. Park, chairman; A. W. Mellon, Reuben Miller, Frank B. Smith, Herbert DuPuy, J. D. Lyon and Jas. H. Park.

PRICE CHART.



THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades

PUBLISHED EVERY THURSDAY BY
THE PENTON PUBLISHING CO.
CLEVELAND.

BOSTON.....73-74 Journal Bldg.
BUFFALO.....932 Ellicott Sq.
CHICAGO.....1328 Monadnock Blk.
CINCINNATI.....First National Bank Bldg.
NEW YORK.....1005 West Street Bldg.
PHILADELPHIA.....408 Central Trust Bldg.
PITTSBURG.....510 Park Bldg.
SEATTLE.....302 Pioneer Bldg.

Subscription, United States and Mexico, $3.00 per annum. To Canada and Foreign Countries, $4.50. Advertising Rates Furnished on Application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POST OFFICE AT CLEVELAND AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP.

COPYRIGHT 1908 BY PENTON PUBLISHING CO.

November 5, 1908.

THE FORTHCOMING CONSERVATION MEETING.

On Dec. 1 next, the National Conservation Commission will meet in, Washington, and a week later it will hold a joint meeting with the governors and their representatives. The commission has started work with much enthusiasm, evinced particularly by those members who are connected with the federal government at Washington. The ambitious plan was at once adopted of taking an "inventory of the natural resources of the United States," and this work, the public is informed, has been proceeding at a gratifying pace, so that the inventory may be presented at the forthcoming meetings, while it will be in good time to be incorporated in the report which President Rosevelt has requested the commission make him not later than Jan. 1 next.

Enthusiasm and ambition are to be commended in all legitimate work, but there is sometimes a question whether they may not lead to the detaching of a morsel larger than can be masticated properly. At any rate, it is painfully evident that thus far the conservation movement is along statistical rather than practical lines. It may be well to learn just what our resources are, but in the long run it is more important to find practical means whereby they can be conserved. The method of attack thus far in evidence reminds one of the satirical fling of Hudibras in regard to prose composition:

> For all a rhetorician's rules
> Serve nothing but to name his tools.

It would be interesting to have a forecast of what will be the outcome of the forthcoming meetings. Already in the literature on the subject the word "preservation" can be observed to be creeping in where one would have looked for the word "conservation." If this excitement is going to grow along the lines already observed, there is danger to be apprehended to the mining and manufacturing industries of the country. In the face of all the railroad and "trust" baiting which has occurred, this is no idle alarm, especially when it is to be noted that a special effort is being made to have the separate state governments up and doing.

Encouragement to the use of natural resources in a way which will give the public the greatest good with the least depletion is one thing, and general restriction to activity is another thing. The former is the line of action which most commends itself. It should be borne in mind that the work which this country is doing is not a unit nor a group of units; it is merely the sum total of the activities of all the individuals of the 87,000,000 people who are fit to do anything.

It is well that the federal government should disseminate information as to our national resources, but the work should be done for the purpose of giving information to the general public, and not for the purpose, or open to the danger, of inviting restrictive legislation unless the necessity has been well proved. There are certain fields in which government work along these lines is an unmixed good, and one of the greatest of these is the discovery of new mineral deposits, whereby the public may develop them. When the Geological Survey, however, seeks to investigate water powers, and to give public utterance to statements that so many millions of dollars' worth of water power is going to waste every year, it is leaving more profitable work to engage in less profitable work. Individual cases where water power is available are probably in all instances known to enough individuals to invite their utilization if the scheme is commercially feasible, and it skills little to give the public these great figures representing totals. It is quite improbable that such advertising will induce any capitalist to go forth to develop any of these opportunities.

DISCOURTESY OF EMPLOYES.

Editor IRON TRADE REVIEW:

Sympathizing with the railroads and interested in their efforts to appease the general dissatisfaction in regard to them, let me suggest one cause that can be remedied. It may seem trivial, but I am firmly convinced that one great "grouch" among the masses has its origin in the lack of common courtesy exhibited by railroad officials and employes in so many ways that we cannot go into detail. Travelers' questions are not answered fully and politely—the baggage truck men at stations push their trucks through crowds of passengers without warning or with an arbitrary command to "get out the way." Where no competing line exists, the general freight agent tells you in a lordly manner, "this is our rate—what are you going to do about it?"

If the high officials on some of our leading railroads would occasionally travel *incognito* as common passengers, in place of using their private cars, they would find many things to correct. I have often seen passengers ignored or insulted in a way that would cause the discharge of employes in any other business.

Let the railroads insist on the same attention and politeness from their employes to patrons, required by large department stores or any other business sustained by the public, and I venture the assertion that the dissatisfaction so prevalent over the country will largely subside.

JNO. W. SUTTON.

Indiana, Pa., Oct. 19.

STRONGER TONE

Of Business on North Pacific—Price of Steel Rails Cut.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Oct. 30.

With the election only a few days away and its effect generally discounted, the iron and machinery business of the Pacific coast is indicating a much stronger tone than for some time past. One of the most encouraging features of the situation is the improvement in the foundry business; orders for castings have picked up noticeably during the past 10 days. One order for 450 tons of building castings has been recently booked by a Portland foundry. The machinery trade is steady in volume and in general prices are quite satisfactory. Advices from lumber sources indicate steadily improving conditions. The market for heavy steel rails is not satisfactory and business is meager; it is also generally admitted that a large western interest is quietly cutting the standard price $2 a ton. Wire products remain firm and in good demand.

A permit has been issued to the Metropolitan Building Co. for the construction of a second 11-story building on Fourth avenue near the White building. The building is to cost $450,000 and about 1,000 tons of structural steel will be necessary. Stone & Webster are the constructing engineers and the steel contract will probably be let in Boston.

It is reported that the Port Blakeley Mill Co., Port Blakeley, Wash., will rebuild its big lumber plant which was destroyed by fire April 22, 1907. The mill company is able to proceed with the reconstruction on account of a favorable decision by the Washington supreme court in the case of the mill company against the Hartford Fire Insurance Co. As the mill is to be one of the largest in the world, it will involve the purchase of an immense amount of new machinery. It is said that preliminary orders to the extent of $75,000 have already been placed.

Work on the two open-hearth furnaces now being erected at the plant of the Irondale Furnace Co., Irondale, Wash., is progressing satisfactorily and the foundations are nearly completed. The company expects to push the work as rapidly as possible.

B. F. Rhorer and M. Doolittle, master mechanic for the Pittock & Leadbetter Lumber Co., both of Vancouver, Wash., are planning the erection of a new foundry at Vancouver to be known as the Vancouver Iron Works.

The Globe Iron Works, Tacoma, Wash., has been incorporated to succeed the Tacoma Brass & Machine Works. The officers of the new company are J. Bamford, president, J. C. Ollard, vice president and C. Mathews, secretary and treasurer.

John W. Balfour, of Tacoma, has incorporated the Balfour Spike & Mfg. Co. with a capitalization of $100,000.

The Snohomish Iron Works, Snohomish, Wash., recently poured the largest single casting ever made in Snohomish county. It was a cylinder for a 150-ton hydraulic press being constructed by the company for its own use and weighs 2,800 pounds.

The Pacific Iron Works, Portland, reports that its recent order for structural material for the Crane Co.'s new wire house at Portland is divided as follows: 225 tons of cast columns and 225 tons of steel floor beams.

DRY BLAST INSTALLATION.

The York Mfg. Co., York, Pa., has secured the contract for installing the dry blast refrigeration system at the plant of the Toledo Furnace Co. The equipment includes three 280 ton single acting engines, 70 coils of ammonia condensers, 24 pipes high and 24 feet long, and 2 inch pipes. The difference between this and a similar installation at the plant of the Warwick Iron & Steel Co., and the Isabella furnace, is that at the older plants double pipe brine coolers are used, and in the Toledo Works there will be four shell and two tube direct return brine coolers, of 210 tons capacity each, with a total capacity for cooling 13,070 gallons of brine, from 33 degrees to 10 degrees Fahr. The cooling system will take care of 80,000 cubic feet of air per minute.

Tool Steel Project.—The Rothert Steel Co. of Hoquiam, Wash., has been incorporated for $100,000 by E. H. Rothert, president, and Edward Arthand. The company, which expects to manufacture tool steel from the black sand ores of Grays Harbor and the surrounding territory, already owns a crucible furnace and is planning on building a small open-hearth plant. The steel is made by mixing certain fluxes with the ore directly in the crucible or hearth. Some steel has so far been made in this manner. It is said that the ore used is peculiar in that its composition is practically uniform throughout the entire deposit. The following is claimed to be a representative analysis of the ore: Iron, 72 per cent; silica, 0.02; phosphorus, 0.01; sulphur, 0.005; manganese, trace; titanium, 10.00. It is the province of the fluxes used to reduce the high percentage of titanium.

FINE CONDITION

Of National Metal Trades Association in Spite of Business Depression.

The administrative council of the National Metal Trades Association held a meeting in Cincinnati, Oct. 29 and 30, at the Sinton Hotel. The members of the council were much gratified to find the affairs of the association in such excellent condition. In spite of the industrial depression, the financial statement shows an increase in the funds, while a decrease would not have been a disappointment. The membership consists at present of 726 firms and corporations. It has been found that the few resignations received during the past year have been practically offset by the acquisition of new members.

The officers of the association were complimented by the council on the showing made and for the excellent judgment displayed in handling the affairs of the association.

An examination of the number of operatives employed in the shops of the members indicates that there are at present about 68 per cent of the normal number. The trend of reports concerning business indicated better conditions in the East than in the West. There are no strikes on anywhere in the shops of the members of the organization.

It was decided to hold the next annual meeting of the association the latter part of March, 1909, in New York City. Those present at the meeting were: President F. K. Copeland, of the Sullivan Machinery Co., Chicago; second vice president, J. H. Schwacke, of Wm. Sellers & Co., Philadelphia, Pa.; treasurer, Wm. Lodge, of the Lodge & Shipley Machine Tool Co., Cincinnati; commissioner, Robert Wuest; secretary, N. W. Dingwall; and councillors, John R. Back, of the F. E. Reed Co., Worcester, Mass.; P. B. Kendig, of the Seneca Falls Mfg. Co., Seneca Falls, N. Y.; C. Bermingham, of the Canadian Locomotive Co., of Kingston, Ont.; M. K. Bowman, of the Griscom-Spencer Co., New York City; H. W. Hoyt, of the Great Lakes Engineering Works, Detroit; E. P. Robinson, of the Atlantic Works, East Boston; W. A. Layman, of the Wagner Electric Mfg. Co., St. Louis; M. H. Barker, of the American Tool & Machine Co., Boston. The only absentees were First Vice President H. P. Eells, of the Bucyrus Co., Cleveland, who is in Europe, and George Mesta, of the Mesta Machine Co., Pittsburg, who wired his inability to be present.

Increased Confidence in Stocks.

Industrial securities with few exceptions reflect the feeling of increased confidence which prevails throughout the iron and steel trade, and while the volume of trade was comparatively light, sales generally were made on a higher basis than those recorded a week ago. One feature regarded as favorable was the purchase of American stocks for foreign account, and as very little was heard of the Balkan situation, this factor has been practically eliminated. The quarterly report of the United States Steel Corporation was the most favorable development of the week. Early in October, the estimates of the quarterly earnings did not range much above $21,000,000, which was slightly better than the earnings for the preceding quarter; the official report, however, showed net earnings of $27,106,000, which is a big increase over the two previous quarters of the year. The increase in both net earnings and new tonnage, which occurred during the early part of the presidential campaign, and at a time when spring wheat and corn crops are not yet out of danger, is construed to indicate that the necessities of consumers became so pressing that they were compelled to come into the market despite seasonable drawbacks and the retarding influence of the general election.

This increase in earnings confirms the statements that have been made concerning the prosperity of the west. But the feature of the reporit which excited most interest was the reduction of nearly $1,000,000 in operating expenses. The weekly bank statement showed the general position of those institutions to be little changed. A rather heavy loss of cash reserves was offset in the actual figures by a $10,000,000 loan reduction, leaving the surplus $250,000 over the preceding week. No very obvious explanation of the decreased loan account was provided, except for the rather general assumption that "distribution" of stocks by the large speculative interests has been in progress during the week. The statement of the New York clearing house banks for the week shows that they hold $33,589,125 more than the requirements of the 25 per cent reserve rule. This is an increase of $709,125 in the proportionate cash reserve as compared with the preceding week. Loans showed a decrease of $5,061,300, and the deposits, which amounted to $1,411,416,300, showed a decrease of $6,716,100. The percentage of actual reserve of clearing house banks at the close of business on Oct. 31 was 27.55. The statement of banks and trust companies of Greater New York not members of the clearing house shows that these institutions have aggregate deposits of $1,083,505,400; total cash on hand, $102,889,400, and loans of $976,105,400.

Copper Stocks.

New York.—Amalgamated Copper closed 79¼, a net loss of ⅛.

Boston. — Butte Coalition closed 26¾, a net loss of ¼; Calumet & Arizona closed 119½, a net loss of ½; Calumet & Hecla closed 660, no change; North Butte closed 83⅜, a net loss of ⅜; Quincy Mining closed 95, a net gain of 1¾.

Financial Notes.

The directors of the Pressed Steel Car Co. have declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable Nov. 25 to stock of record of Nov. 4; the directors of the United States Steel Corporation have declared the regular quarterly dividend of one-half of 1 per cent on common stock, and 1¾ per cent on preferred stock. The common dividend is payable Dec. 30. Books close Dec. 10 and are opened Dec. 31. The preferred dividend is payable Nov. 30. The Buckeye Steel Castings Co., Columbus, O., has declared the quarterly dividend of 1½ per cent on preferred stock and 1 per cent on common stock, payable Nov. 2.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Oct. 31	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	11¾	+ ⅛	Sept. 3	19,820,000			
Allis-Chalmers pr	39⅛	− ⅛		16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	7	+ ⅛	Feb. 3	41,233,300			
Am. Can pr	68¼	+2½		41,233,300	7 cum	1¾ Q.	Oct., 1908
Am. Car & Foundry	42¼	+ ¾	June 25	30,000,000		½ Q.	Oct., 1908
Am. Car & Fdy. pr	.....	.....		30,000,000	7 n. c.	1¾ Q.	Oct., 1908
American Loc	40¾	− ⅛	Oct. 20	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	106⅛	+1⅛		25,000,000	7 cum	1¾ Q.	Oct., 1908
American Ship	56	+3	Oct. 14	7,600,000	4	1 Q.	June, 1908
American Ship pr	100	.....		7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries. pr.	.....	.....	Oct. 6	15,810,000			
Am. Steel Foundries(new	30⅛	+ ⅜		14,247,400	6 cum	2½	Aug., 1904
Barney & Smith	40	.....	June 2	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	110	.....		2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	22	+1⅞	April 7	14,862,000			
Bethlehem Steel pr	49	+3		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	35⅞	− ⅜	March 17	45,000,000*	6	1½ S. A.	Aug., 1908
Cambria Iron	46	.....		8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	23	+1	Feb. 17	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	35⅞	+ ¾	Oct. 19	34,235,500		3½	April, 1902
Crucible Steel	71⅛	+ ⅜	Oct. 21	24,578,400			
Crucible Steel pr	98⅜	+2⅜		24,436,500	7 cum	1 Q.	Dec., 1907
Empire Steel	6	.....	Feb. 26	1,254,770			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1908
Fay & Egan	100	.....	Feb. 18	1,000,000	6	1½ Q.	Aug., 1908
Fay & Egan pr	110	.....		1,000,000	7 cum	1¾ Q.	Aug., 1908
General Electric	.....	.....	May 12	65,167,000	8	2 Q.	Oct., 1908
Harbison-Walker	13	.....	Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	73½	−1½		9,600,000	6 cum	1½ Q.	July, 1908
International Pump	19⅜	+ ⅛	June 2	17,787,300		1	April, 1905
International Pump pr	80¾	+ ¼		13,835,000	6 cum	1½ Q.	Aug., 1908
Lackawanna Steel	36	+ ½	March 11	34,971,400		.....	.....
Lake Sup. Corp	7	− ⅛	Oct. 7	40,000,000			
New York Air Brake	76	− ½	June 18	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	130	.....	Feb. 5	8,500,000	6	1½ Q.	Sept., 1908
Niles-Bement-Pond pr	100	.....		2,000,000	6 cum	1½ Q.	Aug., 1908
Otis Elevator Co.	37	.....	March 16	6,156,600		1½ S. A.	April, 1908
Otis Elevator Co. pr	90	.....		5,449,500	6 n. c.	1½ Q.	Oct., 1908
Penn. Steel	50	.....	May 11	10,750,000			
Penn. Steel pr	100	.....		16,500,000	7 n. c.	3½ S. A.	May, 1908
Pittsburg Coal Co.	11¼	.....	Feb. 10	28,853,400		.....	Nov., 1906
Pittsburg Coal Co. pr	40	.....		27,030,800	7 c.	1¾	April, 1905
Pressed Steel Car	33⅞	+ ⅜	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	92	.....		12,500,000	7 n. c.	1¾ Q.	Aug., 1908
Pullman	165	+3	Nov. 11	100,000,000	8	2 Q.	Aug., 1908
Railway Stl. Spring	38	.....	March 5	13,500,000	4	2 S. A.	April, 1908
Railway Stl Spring pr	98	.....		13,500,000	7 cum	1¾ Q.	Sept., 1908
Rep. Iron & Steel	23¾	+1	Oct. 21	27,191,000			
Rep. Iron & Steel pr	81	+1¼		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	71½	+5½	March 11	10,000,000	5	1 Q.	Sept., 1908
Sloss-Sheffield pr	103¼	.....		6,700,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Pipe & Fdy.	23⅞	.....	June 24	12,500,000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr	70	.....		12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	47¼	− ⅛	April 20	508,302,500	2 n. c.	½ Q.	Sept., 1908
U. S. Steel pr	110¾	− ¾		360,281,100	7 cum	1¾ Q.	Aug., 1903
U. S. Steel 5'	103⅜	.....		463,798,000	5	5 A.	.....
Valron, Coal & Coke	56½	.....	Nov. 17	9,078,680		.....	.....
Westinghouse Elec.	82¼	−7¼	June 24	28,933,200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	103½	− ½	Oct. 6	14,000,000*		2½ Q.	Oct., 1908

Par value of shares, $100, except those starred (*), $50

VISIT CEMENT PLANT.

Engineers' Society of Western Pennsylvania Guest of Universal Portland Cement Co.

The new plant of the Universal Portland Cement Co. at Universal, Pa., was inspected by the Engineers' Society of Western Pennsylvania and invited guests Saturday afternoon, Oct. 31. The inspection party, numbering more than 400, was one of the largest ever assembled by the engineers in western Pennsylvania for a similar trip, and its entertainment by the Universal company was thoroughly complete and hospitable. A special train of nine Pullman cars provided by the company left Pittsburg at 1 o'clock, landing its party several hours later at the plant, where the remainder of the day was spent in witnessing the manufacture of Portland cement from furnace slag. Luncheon was served on the return journey. The trip was in charge of B. H. Rader, eastern sales agent of the Universal company, and a special committee of the engineers' society.

The new plant consists of extensive buildings of reinforced concrete with steel frames, covering a large tract of land, and has a daily capacity of 4,500 barrels. Plans have already been prepared providing for more than doubling the output of the works, and it is expected that active construction work will be commenced in about a month. This extension was arranged for in the original plans for the new plant, and the completed establishment will have a capacity of approximately 10,000 barrels daily. The Universal plant, which has been in operation since December, 1907, derives its electric power from the Carrie blast furnaces of the Carnegie Steel Co. at Rankin, where the waste furnace gas is utilized and the current transmitted.

With the completion of the new steel mills and blast furnaces by the United States Steel Corporation at Duluth, Minn., and Birmingham, Ala., the erection of two large additional cement plants is projected for the converting to commercial uses of the slag from the blast furnaces.

In connection with the inspecting trip the Universal company had prepared a brief description in pamphlet form of its process of manufacture, which was placed in the hands of each guest. This is as follows:

The raw materials used in the manufacture of Universal Portland cement are limestone and granulated blast furnace slag. The limestone chosen is practically pure calcite and the slag is carefully selected from the product of the Bessemer furnaces. Uniformity in the chemical composition of the slag and limestone insures a finished product remarkably uniform in action and color.

The raw material is stored in separate storage bins at one end of the raw material building. From these bins the stone is fed to Gates gyratory crushers which prepare it for the driers. The stone from the crushers and the slag direct from the storage bins is fed to the driers which are maintained at sufficient temperature to drive off all moisture. From the driers each of the raw materials is conveyed to ball mills where the rolling and impact of forged chrome steel balls reduce them to an extreme fineness.

From the ball mills the materials are conveyed to separate hoppers from which they are drawn off and properly proportioned by an electrically operated weighing device. The slag and stone now united pass to the tube mills where flint pebbles rolling in a steel drum thoroughly mix and complete the grinding of raw material..

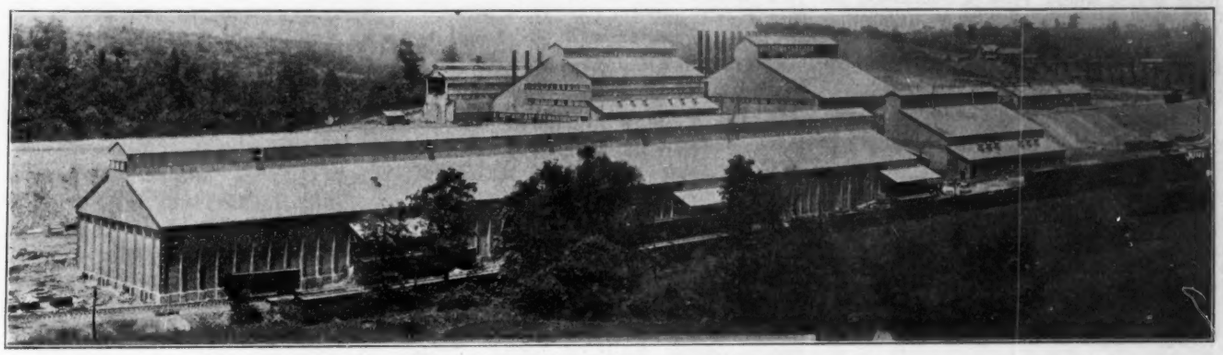
The raw mixture is now ready for the process of calcination, which is conducted in rotary kilns 120 feet long, 7 feet 6 inches diameter.

Leaving the rotary kilns the burnt clinker passes to the clinker storage pit, where it is cooled and thoroughly cured. It is now ready to be finished and is conveyed to the finishing mill hoppers by electrically operated cranes. Passing through jaw crushers the clinker is fed to Kent mills and then passed over Newago separators.

To the fine material leaving the separators is now automatically added the desired quantity of gypsum. This automatic device accurately proportions the quantity of gypsum to given weight of cement and thus insures uniform setting time.

Leaving this device the material passes through tube mills similar to those used in finishing the raw material and is conveyed from the tube mills, when ground to the specified fineness, on a belt conveyor from which it is automatically tripped into the various bins. This belt, almost one-third of a mile long, passes the full length of the stock house, which has a storage capacity of 500,000 barrels. This large capacity insures well aged cement and owing to the facilities for packing permits of prompt shipment.

An automatic sampling device taking samples continuously from the finished cement belt gives the samples on which the various tests for quality are made.



UNIVERSAL PORTLAND CEMENT CO.'S PLANT AT UNIVERSAL, PA.

LARGE ELECTRIC CONTRACT.

The Westinghouse Electric & Mfg. Co. has been awarded an extensive contract by the Pennsylvania Railroad Co. for the electrification of the entire system of this road between Harrison N. J. and Jamaica, Long Island. The contract, which calls for electrical equipment aggregating a valuation of $5,000,000 was placed after the Pennsylvania had conducted exhaustive experiments over a period of three years of the several systems proposed. The total expenditure involved is expected to exceed the stated figure before the improvement is completed. Electric locomotives of the most powerful type will be used in the system and some of these which have undergone testing, have shown a speed of 90 miles an hour. President George Westinghouse of the Westinghouse company states that the contract will be completed in a period of about 20 months.

BUYING BY ANALYSIS

Favored by the Pittsburg Foundrymen's Association.

The Pittsburg Foundrymen's Association, at its monthly meeting at the Hotel Duquesne Monday evening, Nov. 2, expressed its judgment in favor of the buying of pig iron by analysis, a resolution to this effect being unanimously passed. This action preceded a thorough and interesting discussion of standard specifications for foundry pig iron, in which both foundrymen and furnacemen participated.

H. E. Field, of Mackintosh, Hemphill & Co., chairman of the committee of the American Foundrymen's Association, opened the subject. Mr. Field suggested the advisability of establishing a standard base analysis for foundry iron, calling for a fixed content of silicon and sulphur with a sliding scale arrangement which would allow a fluctuation in price by a certain constant, according to variations in the two elements.

The suggestion as to the working out of this sliding scale for iron analyzing above or below the base was to allow 25 cents from or to whatever price the contract might call for, according to the respective cases, for each unit of variation in the silicon or sulphur content. This arrangement would in no manner interfere with the market price of standard foundry iron at the time it was bought or during the life of the contract, this being as much a matter of individual settlement as at present. It would, however, provide a generally accepted and understood ratio for grades ranging according to analysis from the standard base. Mr. Field explained that his proposition was merely a tentative one, and that his committee was now at work upon the question of a standard specification, but had as yet reached no conclusions.

Walter Wood, of R. D. Wood & Co., Philadelphia, representing the committee of the American Association for Testing Materials, which is also working for a standard specification of pig iron, was present, and spoke upon the subject. He said the purpose of a standard specification in itself and outside of any contractual relations such as price arrangement, etc., was to afford the foundryman a clear recognition of an iron upon which he could base his calculations according to his individual needs as he knew them. Mr. Wood thought that the question could be handled in logical steps, first, whether buying by analysis is desirable, and second, what should be fixed as a standard analysis.

E. H. Williams, of the Perry Iron Co., Erie, Pa., spoke on the difficulties from the furnaceman's standpoint of always meeting ironclad specifications. This followed from a lack of uniformity in the manufacturing process beyond the control of the furnace, and resulting in the handling of the crude and varying materials, such as the ore, coke, limestone and even air. Mr. Williams believed that any standard specification should be broad enough to cover the variables in the manufacture for which the furnacement were not responsible.

Mr. Mason, of the Midland Steel Co., Pittsburg, expressed his opinion that the fixing of any standard basis to be of value must be general in its scope, applying to furnace men and foundry men in all parts of the country. Other Pittsburg foundrymen and pig iron buyers who were present gave their views upon the subject. The sense of those present was that the standard base to be adopted should range from 1.75 to 2.25 silicon and 0.05 sulphur.

LABOR NOTES.

Unionists Employ Injunction Against National Officers.

The supreme court of Massachusetts, on Oct. 26, in an injunction proceeding, decided that labor unions can not impose fines on their members in order to force them to go out on a strike. The decision was rendered on a petition brought by G. D. Walcutt Sons & Co., asking for an injunction against the Bricklayers' and Stone Masons' Benevolent Union, restraining them from imposing a fine of $100 each on two members of the union who had refused to go out on strike.

The boilermakers' strike in the Lehigh Valley railroad shops at Sayre, Pa., which began March 27, has been declared off by the men. From the first, it is said, the strike was a failure, and all the men made application to be reinstated.

When the lasters at Lynn, Mass., called off their strike the other day, practically every man who struck returned to work. There is just a scattering bit of trouble in the shoe district.

Despite the vehement denunciation of the use of the injunction by courts in labor disputes, Indiana union miners have asked for an injunction against their national officers. The suit was brought by W. D. Van Horn, president of the Terre Haute, Ind., district miners' organization and other local officers against Thomas Lewis, national president, and all the other national officers, restraining them from deposing the district officials from office. A temporary restraining order was immediately granted and the hearing set for Nov. 9.

TRANSFERRED FROM ONE CONSTITUENT TO ANOTHER.

(Special Telegram.)

New York, Nov. 4.—Arrangements have been made for the transfer to the American Steel & Wire Co. of the Donora steel plant, including four blast furnaces, heretofore operated at Donora, Pa., by the Carnegie Steel Co. The Neville and Edith furnaces, Allegheny, heretofore operated by the American Steel & Wire Co., have been transferred to the Carnegie Steel Co.

PERSONALS.

Harold McGeorge is now connected with the New York Blower Co., representing it in northern Ohio and western Pennsylvania. His offices are at 1718-20 Williamson building, Cleveland.

Frank Ryman, formerly with the Oliver Iron & Steel Co., is now associated with Williams, White & Co., Moline, Ill., and opened an office for that company in Pittsburg, Nov. 1, at 808 House building. Up to that time, Mr. Ryman has been in the manufacturing department of the forging business and his experience will be of assistance to those interested in forging machinery.

OBITUARY.

Wilson Miller, at one time a prominent manufacturer of Pittsburg, died in that city Oct. 31 from a stroke of apoplexy at the age of 80 years. Mr. Miller began business with Spang, Chalfant & Co., one of the older iron companies of the Pittsburg district. Later he became a member of the firm of Robinson, Minnis & Miller. His leading achievement in a business way was in the organization of the Pittsburg Locomotive Works, of which he became president. He remained in active charge of the affairs of this company until the plant was absorbed by the American Locomotive Co. This consolidation was followed by Mr. Miller's retirement from active manufacturing business. He was a director of several Pittsburg banks and was a warm supporter of notable philanthropies.

The Latrobe Coal Co. has fired its coke plant, located near Latrobe, Pa., and now has 136 ovens or its full capacity, in blast.

AMONG MACHINERY MAKERS.

NEW YORK.

Better Inquiry in Spite of Election Postponements.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Nov. 3.

In spite of the fact that a very large number of transactions are being held up until after the elections, the New York machinery trade is finding a better inquiry than for a long time past. No large lists are in the market, but calls for individual tools are much more numerous and are generally resulting in business. While October has averaged well with most dealers, there is every reason to expect that November will show important gains. The inquiry for cranes is particularly good.

The American Cement Engineering Co., a relatively new concern located at 315 Fifth avenue, New York City, is preparing plans for a cement plant to be built at Hudson, New York, by the Knickerbocker Portland Cement Co. This plant will have a daily capacity of 6,000 barrels, and work on it will probably begin as soon as plans can be completed. It is also probable that a second plant of the same capacity will be built a little later. The Knickerbocker company has offices at the same address.

The American Smelting and Refining Co., 165 Broadway, New York City, has requested prices on a number of caboose cars.

Important developments are expected as a result of the recent incorporation, with a capitalization of $2,500,000, of the Magnesia Company of New York, principal offices of which are at 1 Madison avenue, New York City. Gustave B. Janson, at this address, is one of the directors of the new company and will probably be chosen treasurer. A new building for drying purposes is being erected at the company's plant in Woodside, a suburb of Newark, N. J., and another plant is practically ready for operation.

In regard to reported improvements at the plant of the Manhattan Brass Co., 332 E. Twenty-eighth street, New York City, President G. M. Smith informs us that nothing more is in prospect at the present time than the annual overhauling of the works. This will involve some rather extensive repairs to one of the mills.

The New York Central has not yet announced awards on its crane requirements, for which prices were recently received. The inquiry covered a half dozen cranes of about 60-foot span. A goodly number of crane inquiries, chiefly of small size but promising early business, came to light during the past week.

The contract for enlarging the courthouse at Boston, Mass., which was reported a week ago as awarded to F. T. Nesbit & Co., 116 Nassau street, New York City, will involve an immense amount of work, the contract figure being $672,000. Two stories will be added and other improvements made.

Typographical errors occurred in the name and address of the company which is to build a malleable foundry at Corning, N. Y., mentioned in this letter a week ago. The correct name is the T. H. Symington Co., and its principal offices are at Baltimore, Md.

J. G. White & Co., 43 Exchange Place, New York City, has been awarded the contract for extensive water power development work by the Minnesota & Ontario Power Co., a concern recently incorporated with $7,000,000 capital. A dam and power stations will be completed in the northern Minnesota district and a paper mill will be erected. Warren Curtis, 30 Broad street, New York City, is one of the directors, the others being chiefly western men.

It is reported that the Lehigh Valley Railroad Co. will enlarge its yards at Manchester, N. Y., adding a $40,000 machine shop. Walter G. Berg, 143 Liberty street, New York City, is chief engineer.

INDIANAPOLIS.

Political Activity Interferes With Business to Some Extent.

Indianapolis, Ind., Nov. 2.—Iron and machinery manufacturers report that they have enjoyed an unusually good business during the last three months, considering that it has been campaign year. There is no doubt, however, that the campaign has had some serious effect on local business because of the political activity in a number of plants. Following the election tomorrow, it is expected that the various industries will operate under practically normal conditions and that business will continue good throughout the winter months.

Hetherington & Berner last week sold an asphalt repair plant to the City of Mexico, Mexico, which will be shipped within the next three weeks.

Due to an explosion, the city of Frankfort is in the market for about $12,000 worth of mechanical equipment for its municipal electric light plant.

Judge Charles T. Hanna, of the Superior court last week approved the sale of the Insley Iron Works, by the receiver, William H. Insley, to Jacquelin S. Holliday. The consideration was $6,150.

The Noblesville plant of the McElwaine-Richards Co., will be sold on Dec. 23, by the receiver, the Union Trust Co., of this city. The plant has been in the hands of a receiver for about six years, the action having been brought at that time by the Exchange bank of Anderson. During the receivership five dividends of 10 per cent each have been paid.

Judgment for $22,500 in favor of James B. Allfree, against the Allfree Engine Co., has been given by the Superior court here. The company has been in the hands of a receiver for five years and Mr. Allfree asked for $22,500, asserting he had turned that amount into the company from the sale of his patents.

MILWAUKEE.

Decided Improvement Expected At an Early Date.

Milwaukee, Wis., Nov. 2.—Milwaukee manufacturers are expecting a decided improvement in the business field now that the uncertainty of election has partially cleared away. Several leading machinery manufacturers say that they have had numerous large orders hanging fire which will soon be placed. In addition to the various concerns, recently reported, which are enlarging their Milwaukee plants, several other well known manufacturing establishments are building new plants and erecting substantial additions.

Work on the new plant of the Badger Malleable & Mfg. Co. at North Milwaukee, is rapidly progressing and it is expected that it will be in operation at the opening of the new year. The largest of the three factory buildings which are being erected is 80 x 444 feet in dimension. The plant will turn out malleable iron castings and specialties. A. J. Rickert, of South Milwaukee, is president of the company.

The Bucyrus Co., well known manufacturer of steam shovels, South Mil-

waukee, is erecting a fine building which will be a substantial addition to the large plant. It will be called the finished stock and shop office building, the first floor to be used for storage purposes and the second floor for shop and drawing offices. The Bucyrus Co. recently increased its capital stock from $300,000 to $1,000,000.

Among the various appointments made by the executive committee of the board of regents of the University of Wisconsin, was that of Martin Peyton, who was made instructor in foundry work.

The Milwaukee board of public works will take bids until Nov. 10 for the furnishing of 4,000 tons of 36-inch class "C" cast iron water pipe and 75 tons of 36-inch class "C" special castings. Delivery of the pipe and castings will begin on March 1, 1909.

Among the contracts awarded for the erection of the new $35,000 light and fog signal station at White Shoal on Lake Michigan, 20 miles from the Straits of Mackinac, was the contract for the structural steel to the Milwaukee Bridge & Iron Co. The contract for the cast metal was given to the Atlantic Machine Co., of Atlanta, Ga.

Ralph M. Burdick, of Eau Claire, Wis., inventor and manufacturer of the Burdick marine engine, with C. W. Vandewater has purchased the entire plant and business of the American Motor Co. at Eau Claire and will now engage in the manufacture of a high grade line of automobiles. The manufacture of the marine engine will be carried on as formerly.

CINCINNATI.

October Not as Favorable for Business as the Preceding Month.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Nov. 3.

The closing week of October was a comparatively quiet period in the machine tool and machinery trade and the month was not productive of as much business as was placed in September in this locality. While this is true, correspondence has continued to reflect an awakened interest in machine tools, and evidences of considerable business pending and held up waiting election results are pronounced. During the past week, a number of agents for the manufacturers have visited the shops with a view to acquainting themselves with whatever new tools are under development and to get in closer touch with the manufacturing interests. There is apparent a desire on the part of agents and dealers to be prepared for an increase in demand for machinery following the election; and the outlook seems to be more hopeful for a gradual increase in activities.

Some manufacturers have had a fairly good run of orders in the past week and one nice export shipment is reported.

The Cincinnati Machine Tool Co. has received during the past week several satisfactory domestic orders and forwarded a carload of drills for export.

The John Steptoe Shaper Co. received orders this week for one 25-inch shaper, two 16-inch single gear shapers and one 16-inch back gear shaper, all to go directly into use and not into dealer's hands.

The Rahn-Carpenter Co. has not yet completed negotiations for establishing a branch of its business at Anderson, Ind., but the project is still under serious consideration.

The administrative council of the National Metal Trades Association held a meeting in this city during the week at the Sinton hotel at which meeting a number of the most prominent machine tool builders, members of the association, were present.

The Hisey-Wolf Machine Co. reports a fairly good demand for light portable drills and regards conditions as showing steady improvement.

The Lodge & Shipley Machine Tool Co. will have its addition, which has been under construction for some time, ready for occupancy in a few days.

The Cincinnati Lathe & Tool Co. regards the outlook for business after the election as quite encouraging, as correspondence indicates a number of prospective purchases simply held off until election results are received.

PITTSBURG.

Gradual Improvement Expected—Some New Additions.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Nov. 3.

Although during the past several weeks there has been some machinery in projects which a month ago were stated to be held up until after election, the general situation exhibits little change and the effect of the campaign is still in evidence. Orders for single machines continue the main support of the market and large installations are the exceptions. It is generally believed that some business will be released following the election, but the true extent of this is problematical and it is apparent that there is a disposition in some circles to exaggerate such projects. More conservative manufacturers anticipate that the improvement likely to come in the near future will be very gradual. There are more definite indications that in rolling mill and steel works equipment, the placing of a number of fair-sized contracts may be expected soon.

The Wm. B. Scaife & Sons Co., Pittsburg, manufacturer of the Scaife and We-Fu-Go water softening and purifying systems, reports an extremely satisfactory year's business. Many steam users who do not possess an available supply of soft, clear water for boiler feed which does not cause scale or corrosion, are installing water softening and purifying systems to remove the objectionable substances. Among some of the recent contracts taken by the company are the following: Eastman Kodak Co., Rochester, N. Y., 3,000-horsepower We-Fu-Go system; Armstrong Cork Co., Pittsburg, second order, 2,250-horsepower We-Fu-Go system; Rochester & Pittsburg Coal & Iron Co., Punxsutawney, Pa., seventh order, 750-horsepower We-Fu-Go system; Pittsburg-Buffalo Co., Burgettstown, Pa., 1,000-horsepower We-Fu-Go system; Gowanda State Homeopathic Hospital, Gowanda, N. Y., 750-horsepower We-Fu-Go system; Fort Pitt Hotel Co., Pittsburg, 1,000-horsepower Scaife system; and the Rochester, Syracuse & Eastern Ry. Co., Syracuse, N. Y., 250-horsepower Scaife automatic system.

Among the extension projects in the western Pennsylvania manufacturing district in which equipment makers have been lately interested, are the large improvements now under way to the plants of the Petroleum Iron Works Co., Sharon, Pa., and the National Malleable Castings Co., Sharon, Pa.

One of the largest projects now before the equipment trade in this district is the erection of the extensive new plant for the Crane-Best Co., of Pittsburg, at Oakmont, Pa., which is the style name of the partnership agreement entered into by the Crane Co., of Chicago, and the Best Mfg. Co., of Pittsburg. Bids will go in this week for the construction of the new buildings, which are to be of very extensive proportions.

The Youngstown Sheet & Tube Co. will begin to move into its new rod and wire mill at its Struthers works early in December. The Struthers plant, which was acquired by the company from the Morgan Spring Co., has been practically rebuilt. The extensive improvements made include the double stranding of the rod mill, the doubling of the capacity of the

wire mill, the installing of new wire galvanizing and barb wire plants and the erection of a new cooperage shop for the manufacture of nail kegs.

The Scott Iron & Steel Co., which is remodeling a plant at Carnegie, Pa., for the manufacture of steel castings, horseshoes and other lines, has been a recent buyer of some equipment and may install an additional mill and other machinery.

The South Side Trust Co., of Pittsburg, receiver, will offer at public sale, Nov. 29, on the premises of the Pittsburg Trolley Pole Co., 111-117 Water street, Pittsburg, the entire plant of the company consisting of a Bradley hammer, steam hammer, drill press, lathes, milling machine, shaper, engines, drill grinder, dynamo, swedging machine, screw cutter, pipe cutting machine, punches, boiler, fans, shafting, crane, emery wheels, belting, tools, and also a stock of iron and steel pipe and products of the company finished or in the process of manufacture.

The Oil City Boiler Works, Oil City, Pa., manufacturer of marine boilers, is about to begin the erection of a large addition to its plant, which will consist of a brick boiler shop 180 x 355 feet, of steel construction and concrete foundations. The contract for the erection of the addition has been let to W. N. Kratzer & Co., Pittsburg, and the work of erection will be inaugurated this week. Under favorable weather conditions, the new building is expected to be completed by April 1.

The Thomas Carlins Sons Co., Northside, Pittsburg, manufacturer of rolling mill machinery, reports an improvement in orders taken for mill shears during the past month, and the company now has more equipment of this class in the process of manufacture than at any time for a year. The company recently installed a large steel lever shear with a capacity of about six inches square in the plant of the Janson Iron & Steel Co., Columbia, Pa., and is building a similar shear for the California Industrial Co., Los Angeles, Cal. A large iron shear with a capacity of six inches square is also being built for a scrap dealer in Toledo.

CHICAGO.

Tools Ordered by the Pullman Co.—Other New Business.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, Nov. 3.

The local machinery market has been enlivened by several interesting inquiries for tools in the past week or two, and the volume of small orders has also brought the run of business up to a very encouraging total. The Pullman Co. has ordered quite a list of tools for its new steel car building addition and is now in the market for further requirements. The Calumet Engineering Works at Harvey, Ill., will shortly buy some $10,000 worth of new equipment covering a general line of tools and the Santee River Cyprus Lumber Co., of Ferguson, S. C., is asking for figures on a list embracing about 55 machines. The St. Paul list is as yet unplaced. If all of the prospective orders, on which figures are now in, materialize after the election, machine tool makers and equipment manufacturers will undoubtedly do the largest business of the year.

The Western Electric Co. is still building on its Hawthorne site and the removal of the present Clinton street plant in Chicago to Hawthorne is now only a matter of a few months. At a meeting of the board of directors held this week, H. B. Thayer, former vice president and general manager, was elected to the presidency of the company to succeed E. M. Barton.

Hollis & Duncan, manufacturers of paper bags, with stores and warehouse on South Clinton and South Canal streets, Chicago, are to build a new factory. The estimated cost of the new plant is $100,000.

The Northwestern Consolidated Iron & Steel Co., of Burlington, Ia., is to erect a new plant at that place. The company manufactures hardware specialties.

The Fuller-Ames Co., manufacturing railway specialties, expects to move its business to Joliet where a new plant will be erected.

The Chicago South Forge & Foundry Co., E. R. Eells president, will enlarge its present facilities at once. New property to the extent of about 30 acres, adjoining the present plant in West Pullman near 115th street, has been acquired and the new building construction will begin in the near future. Additional equipment for the increased operations will be required.

The Rockmart Stove & Foundry Co., of Rockmart, Ga., has about completed plans for the establishment of a stove manufacturing plant at Fort Worth, Texas. L. Kimball is the general manager of the company.

E. W. Ritter, 40 Dearborn street, Chicago, is in the market for an air compressor with a capacity of from 500 to 600 cubic feet and a Corliss engine, 125 to 150 horsepower.

E. H. Sheldon & Co., 86 North May street, Chicago, wish to buy a two-drum roll feed sander.

The Heitmann Lumber Co., Chicago, corner of Ashland avenue and Forty-ninth streets, is receiving bids on the erection of a three-story brick building of mill construction, 74 x 122 feet, to be used as a mill and warehouse. New machinery will be installed.

Cast iron pipe foundries are to be established, according to plans now being worked up, at Anniston, Ala., or Atalla, Ga., by Robert Campbell, of Gadsden, Ala.; another requiring the expenditure of $100,000 is proposed for erection at Gadsden by S. E. Jordan and others, and the Central Iron & Coal Co. will build a plant at that place to have an initial capacity of 12,000 tons annually. The company is represented at Holt, Ala., by J. W. Shook, vice president.

Joseph Lister, of 1158 Elston avenue, Chicago, is in the market for a low pressure duplex steam pump with water cylinders having a diameter of from 20 to 24 inches.

The Filer & Stowell Co., Milwaukee, Wis., received a contract for the building of a steel and concrete saw mill for the J. J. Newman Lumber Co., Hattiesburg, Miss. The plant will cost $200,000 and will be equipped with all lumber mill machinery.

The Union Machine & Supply Co., of Nashville, Tenn., whose plant was destroyed by fire with a loss of $20,000, will rebuild. Walter Keith is president.

The foundry plant of the Peoria Foundry Co., Peoria, Ill., which was burned a short time ago, will be rebuilt, the new building to be one story and 100 by 212 feet. James Fitzgerald is the president.

The Webster Full-Expansion Rotary Engine Co., will build an office building, machine shop and foundry at St. Joseph, Mo., and will be in the market for heavy machine shop and foundry equipment. Thomas Flanagan, 520 Francis street, is the engineer in charge.

Greensboro Boiler & Machine Co., Greensboro, N. C., is in the market for a second hand lathe, 12 to 16-inch swing, and 5 to 8-foot bed, and for several drill presses.

The Osborne High Pressure Joint & Valve Co. was incorporated to do business in Chicago. The incorporators are J. J. Tufts, George E. West and F. T. Winslow.

The Schuett Mfg. Co., 590 W. Lake street, Chicago, is in the market for two second hand tumbling barrels.

The Susquehanna Metal Mfg. Co., with a capital stock of $100,000, has these officers and directors: Treasurer, Edgar B. Curtis, Susquehanna, Pa.; directors, Francis Baumer, E. H. Vanvleet, New York; Edgar Curtis.

PROGRESS IN THE ELECTRIC STEEL AND FERRO-ALLOYS INDUSTRIES.---II.

Ferro-Alloys.

By John B. C. Kershaw.[1]

The chief centers of the electric furnace industry for the manufacture of ferro-alloys, are in southeastern France and in Switzerland, many of the water powers in these districts, developed for the production of calcium carbide in the period 1895-1900, being now devoted to the more profitable manufacture. In France, the Societe Electrometallurgique Francaise and Messrs. Keller Leleux & Cie. are the leading producers, while in Switzerland the Societe Anonyme Electrometallurgique Girod takes the lead.

Stahl und Eisen, the leading paper of the German iron smelting industry, in its issue of Jan. 8, 1908, contains an exhaustive article by W. Venator dealing with the present development of the ferro-alloys industry. The raw materials, the methods of production, the composition, application and price of all the more important ferro-alloys are described in considerable detail, and readers interested in this branch of metallurgy will find the original paper well worth perusal and study.

Ferro-Chrome.

Venator estimates the present annual production at 5,000 tons, and expresses the belief that this output will be rapidly increased to meet the growing demand for the alloy. Ferro-chrome is largely used in the manufacture of the special steels employed for armor plates, guns, tools and cutlery; and many quaternary steels contain chromium as one of the hardening elements.

Messrs. Bolckow, Vaughan & Co., Middlesbrough, England, are reported to be producing direct from pig iron, a steel containing 1.5 per cent nickel, 0.25 per cent cobalt and 0.30 per cent of chromium which possesses all the qualities of a steel containing a much higher percentage of nickel, and it is believed that this steel will find a wide field of usefulness for engine and motor car construction. In this case the chromium and nickel are not introduced in the form of alloys, but are present in the original ore, and the difficulties of satisfactorily smelting such an ore, and of converting the pig iron into steel have been surmounted by the firm named.

The following tests are given by Haynes in The Iron Trade Review[2] of a high quality chrome-nickel-steel (made by Krupp of Essen) to show the effect of the after heat-treatment, upon the strength of the steel:

	Normal.	Slightly hardened.	Greater degree of hardness.
Tensile strength, lb. per square inch..	111,943	155,326	221,325
Elastic limit, lb. per square inch..	86,909	148,072	193,589

The quaternary steels containing nickel and chromium, possesses in fact most remarkable properties, for they can be rendered uncommonly hard by heating to redness and quenching in oil, and they can also be given a considerable degree of toughness by drawing the temper after the first hardening. The working and machining of these steels, in the lathe, presented great difficulties until the general adoption of the high speed tungsten steels for tools. When the nickel chromium steel just described has been properly made and treated, it is the most resistent material yet produced as regards resistance to shocks and blows, and it is therefore in great request for sliding gears.

The refined ferro-chrome alloys are generally sold in two qualities, containing from (1) 60 to 70 per cent chromium and 0.30 to 0.75 per cent carbon, and (2) from 60 to 70 per cent chromium, and 1 to 2 per cent carbon.

The alloy containing the lower percentage of carbon, sells at from $700 to $730 per ton, while the No. 2 product only brings $435 to $460 per ton. In spite of its high price, ferro-chrome made in the electric furnace is in wide demand by the high grade steel makers, since a small addition of the alloy has a notable effect upon the value of the finished steel. The melting point of 44 per cent ferro-chrome is given by Hadfield as 1,445 degrees Cent., while the 66 per cent alloy only softens at 1,475 degrees Cent. The Societe Anonyme Electro Metallurgique. Girod, with works at Ugine, France, is one of the leading producers of this alloy, and its annual output is estimated to be now over 2,500 tons per annum.

Ferro-Silicon.

Low grade ferro-silicon containing up to 20 per cent silicon had been produced for some years by ordinary metallurgical processes before the advent of the electric furnace, and the blast furnace is still employed for making this low grade product. Ferro-silicon containing from 50 per cent to 80 per cent of the latter element, can however be produced only by aid of electric heat, and the manufacture of this alloy is now one of the most important branches of electro-metallurgical industry. One of the chief advantages of the high grade product is that it can be added to metal intended for casting purposes when in the ladle, without greatly reducing its temperature, and thus by varying the amount of the alloy added, castings containing different percentages of silicon can be obtained from the one blow and charge of the cupola furnace. The silicon contained in the alloy serves the double purpose of combining with the oxygen in the molten iron, and of rendering it more or less hard, according to the percentage of silicon remaining distributed in the free state in the metal when cold. The silicon in cast iron usually varies from one up to 2.75 per cent. The price of the alloy varies with the percentage of silicon, rising from $68 per ton for the 25 per cent alloy up to $110 per ton for the 75 per cent product. The price of all grades was raised during the latter part of 1907, owing to the action of the French syndicate which controls practically the whole of the production. The leading manufacturers of ferro-silicon are the firms of Keller, Leleux & Cie., at Livet, and the Girod Co. at Ugine, while the alloy is also made by the following companies and works: Bozel Moutiers, Volta Lyonnaise, Mattrei, Sarpsborg, Rheinfelden-Griesheim, Lonza, Plan-du-Var, Lechbruck, Moran, Jaico, Hafslund, Giffre, Notre dame de Briancon, Hagnek, La Praz.

Ferro-silicon is the only ferro-alloy which has shown dangerous properties when stored, and the high-grade product has caused more than one death during shipment and transport. It is believed that the fatalities that have occurred are due to the action of moisture which liberates arseniuretted and phosphoretted hydrogen gas from the impurities contained in the alloy, while the explosions are believed to be due to disintegration and dissociation, from some unknown cause. The prevention of these mishaps should not be diffi-

[1]West Lancashire Laboratory, Waterloo, Liverpool, England.

[2]July 18, 1907.

cult, for the packing and shipping of the alloy in a dry condition in air-tight drums, reduces the danger to a minimum. A project for introducing the manufacture of this alloy into the United Kingdom, is now under consideration in connection with the development of water power upon Loch Awe in Scotland. The scheme, if it takes practical shape, will involve the erection of a factory on Achnacree Moss, near Benderloch, a supply of peat fuel, for reduction purposes, being considered necessary for the success of the proposed manufacture. The electric power would be transmitted a distance of 10 miles to this factory by overhead cables from the generating station on the River Awe.

Ferro-Vanadium.

Considerable attention is being devoted at present, especially in America, to the properties and uses of the vanadium steels, and the manufacturers of ferro-vanadium are thus obtaining many inquiries for this alloy. It is of interest to note that Messrs. Williams & Robinson, of Queensferry, in the United Kingdom, were the first to produce vanadium steel upon a commercial scale. The cost of ferro-vanadium is high, and it is only steel intended for exceptional purposes and uses that can bear the cost of the amount of ferro-alloy necessary to obtain even 0.50 per cent vanadium in the final product.

The value of the vanadium in the raw ore is from $1 to $1.25 per kilogram, and in the form of the ferro-alloy the value rises to $10 or more per kilogram. As a steel which is to contain 0.50 per cent vanadium in the finished state will require an addition of at least 5½ kilograms per ton in the ladle, the additional cost of producing this steel will be about $53 per ton. In spite of this great addition to the cost of the final product, ferro-vanadium is finding increasing use, since next to carbon, it appears to have the most influence of any element upon steel, an addition of 0.10 per cent producing notable effects upon the properties of the finished steel.

The most important producer of ferro-vanadium is the Societe Anonyme Electrometallurgique Girod. According to Hutton this company manufactures from 5 to 10 tons of the alloy yearly. The alloy contains from 30 per cent up to 52 per cent vanadium and the value varies from $2,900 to $5,100 per ton, according to the percentage of vanadium.

The following shows the composition of two grades of ferro-vanadium alloy, made at the Albertville works in France, by the Soc. Girod:

	I. Per cent.	II. Per cent.
Fe	45.84	64.22
C	1.04	1.42
Vd	52.80	34.10
Si	0.09	0.12

The effect of very small additions of vanadium to steel is to impart an extraordinary resistance to dynamic stress and to deterioration under work or strain. The vanadium steels have thus been named "anti-fatigue steels." The vanadium also retards segregation, and it is thus of considerable service in tempering, since it enables the fullest advantage to be taken of the results of heat treatment. All classes of steel are in fact improved by the addition of vanadium, and the following analysis of the latest tool steel developed by Mr. Taylor, of the Bethlehem Steel Co., shows that vanadium is present, though in small amount:

	Per cent.		Per cent.		Per cent.
Tungsten	18.91	Chromium	5.47	Carbon	0.67
Vanadium	0.29	Manganese	0.11	Silicon	0.043

A special quality of open-hearth vanadium steel tempered in the ordinary way has shown the following figures under physical tests:

Elastic limit	224,000 lb. per square inch.
Ultimate strength	232,000 lb.
Elongation	11 per cent.
Contraction of area	39 per cent.

According to Haynes the high elastic limit, strong contraction of area, (which is characteristic of this steel) and silky fracture, together with its great resistance to dynamic stress, makes this steel an ideal material for certain parts of motor cars. In Haynes's table of the comparative strengths of the materials used in automobile construction work, the vanadium steel easily heads the list.

Guillet has published recently some tests made with the nickel vanadium steels and has recommended for them the following proportions:

	Per cent.
Nickel	2.00 to 7.00
Vanadium	0.10 to 0.30
Carbon	0.10 to 0.30

A steel containing 6.2 per cent nickel, 0.16 carbon, and 0.12 per cent vanadium (after tempering) showed the following physical tests:

Ultimate strength	220,000 lb. per square inch.
Elastic limit	209,000 lb.
Elongation	10 per cent.
Contraction of area	46 per cent.

Since the discovery of the valuable nature of ferro-vanadium, new sources of vanadium ore have been opened up, and important mines in the Cerro de Pasco province of Peru, have been purchased by the American Vanadium Co. The ore of this mine is stated to be a rich sulphide, carrying up to 22 per cent of metallic vanadium. The company is now mining the ore at the rate of 10 tons per day, and a maximum output of 100 tons per day is spoken of. The United Steel Co., of Canton, O., is now making vanadium steel for commercial purposes in 50 ton open-hearth furnaces; and recently this company made a heat of about 30 tons, which is believed to be the largest yet made of vanadium steel. In the United Kingdom the New Vanadium Alloys Co., of Swansea, is the leading firm in the industry, the ore employed by this company being obtained from its own mines in Spain.

Ferro-Manganese-Silicon (Silico Spiegel).

This product (a double alloy standing between ferro-manganese and ferro-silicon) is known as silico-spiegel in the steel industry. As in the case of ferro-silicon, silico-spiegel had been known for many years to steel makers before the advent of the electric furnace placed a richer and purer product at their service. The price of the electric furnace product is from $97 up to $125 per ton and varies with the cost of manganese ore; while the silico-spiegel made in the blast furnace does not command more than $36.50 per ton. The earlier method of manufacturing this alloy was to produce ferro-silicon and ferro-manganese separately, in an electric arc and electric resistance furnace, and then to melt the two alloys in a tarred pot. Keller has improved upon this method of production and obtains the double alloy by heating ferro-silicon, flint, carbon and manganese ore, in an electric resistance furnace to a point below the volatilization temperature of manganese.

The value of the product when made by this method is still considerably higher than that made in the blast furnace. Attempts are now being made to produce the double alloy direct from the manganese ores containing a high percentage of silicon, these being at present almost valueless for metallurgical purposes. When these attempts are successful, there will be a further reduction in price of the ferro-manganese-silicon alloy. The following analyses of samples of silico-spiegel, prepared by the electric furnace method, are taken from the paper by Venator already referred to:

	Per cent.	Per cent.	Per cent.
Manganese	74.2	74.1	73.5
Silicon	24.7	19.2	24.2
Carbon	0.30	1.25	0.65

The best grade silico-spiegel contains 50 to 55 per cent manganese and 30 to 35 per cent silicon, with 0.65 per cent or under of carbon. Its value in steel making lies in its use for introducing manganese into the finished steel, without increasing the percentage of carbon.

Ferro-Aluminum.

According to Venator an alloy of iron and aluminum is now being manufactured by the German firm of O.

Gruson & Co., of Magdeburg-Buckau. This alloy is characterized by strength and lightness, and is being largely employed for motor car construction. The specific gravity is only 2.9 to 3.0, as compared with 2.6 for aluminum, and 7.8 for iron, while the strength varies from 25,000 to 34,000 pounds per square inch and the elasticity from 1 per cent up to 5 per cent. The new alloy is named "albidur," and its value in the motor car industry is shown by the fact that the complete structure of a car made in the metal only weighs 84 pounds, as compared with 262 pounds if made of cast iron.

Albidur is white in color and does not oxidize or tarnish in air or in water. The price varies from 53 to 59 cents per pound according to the complexity of the castings. The demand for this alloy is stated to be rapidly increasing, and has already exceeded 22,000 pounds per month. It would seem probable that a further use for this alloy will be found in the construction of air ships and flying machines, since by its use the driving power can be increased, without adding to the weight of the engines.

Ferro-Nickel and Ferro-Chrome-Nickel.

Alloys of iron and nickel, and of iron, nickel and chromium are manufactured by the electric furnace method by the Societe Electrometallurgique de Forges, and by the Societe le Ferro-Nickel, but nothing is known as to the details of the processes employed. A typical ferro-nickel contains 48.49 per cent nickel and 50 per cent iron with manganese and carbon as chief impurities, while the ferro-nickel chrome alloy contains 50 to 52 per cent chromium, 17-19 per cent nickel and 28 to 30 per cent iron. The price of the first named alloy varies from 28 to 70 cents per pound, according to the percentage of nickel, while the alloy containing chromium is valued at 1.70 or 1.80 cents per pound.

Ferro-Tungsten.

This alloy is probably the most important of those used in steel manufacture, since by its use the special tool steel which has revolutionized modern lathe practice, and has reduced from hours to minutes the time required for performing certain work in the machine shops, is produced.

Although it is believed that the celebrated Damascus steel used for sword manufacture, contained tungsten, it is only since the year 1900 that the value of this metal, and of its alloy, ferro-tungsten, has been generally recognized and the manufacture and demand for the latter has become of considerable industrial magnitude. The chief ores from which tungsten is obtained are wolframite and scheelite. The first named contains iron and tungsten in the form of oxide, and it is employed largely for the electric furnace production of ferro-tungsten. Venator estimates the annual production of wolframite at 3,000 tons, of which total the United States mines provide one-third, Queensland and Portugal being the second and third on the list of producing countries. In the United Kingdom, considerable attention is now being given to the mining of wolframite and scheelite, and both in Cumberland and in Cornwall, new companies are exploiting the resources of these two ores. The most important mines are located in Cumberland on the Borrowdale range, while the Carrock mines near Mungrisedale have been acquired by a new company, the Cumbrian Mining Co. This mine had been prevously worked for tungsten ores, but the demand was then less active and the company controlling the operations had to go into liquidation. The Cumbrian Mining Co. has acquired other old mines on the Calbeck Fells, and it is stated that in this district of Cumberland 27 varieties of metallic and non-metallic ore have been found. The demand for rare metals and their alloys in the modern tool-steel industry, will thus doubtless give a new lease of life to many of the mines discarded as valueless, in the United Kingdom and also in other countries.

The price of tungsten ore is based upon the percentage of the oxide which it contains (WoO_3) and varies from $6.25 up to $14 per unit, according to the relation between demand and supply. The cost of a ton of wolframite containing 70 per cent of WoO_3, at $12.50 per unit, is therefore, $850, while the metal itself is valued at from $1,630 to $2,900 per ton. The metal is chiefly produced by a German firm, by reducing the pure oxide with wood charcoal in crucibles. The ferro-alloy is made by heating wolframite with coke, in an electric furnace of the arc type. An average ferro-tungsten contains 72 per cent tungsten, 23.39 per cent iron and 1.75 per cent carbon, whereas the best grade product contains 86 per cent tungsten 13.50 per cent iron and only 0.60 per cent carbon.

The purest grades of ferro-tungsten are produced by treating the impure alloy with wolframite in an electric furnace; the carbon of the alloy is then partly used for reducing the fresh oxide. As regards price, this varies according to the percentages of tungsten and of carbon, a maximum of 1 per cent of the latter element being allowed. An alloy containing 70 per cent tungsten and under 1 per cent carbon, was valued at $2,000 per ton in 1907, and as the special tool steels contain up to 18 per cent of tungsten, their selling price is necessarily high. The extent of the demand for this alloy is shown by the fact that in 1906, the Societe Girod was reputed to be producing 800 to 900 tons of ferro-tungsten per annum, which at an average value of $1,950 per ton, represented a total value of $1,650,000 for this one product alone.

Ferro-Molybdenum.

According to Venator the experimental trials of molybdenum in the steel industry date from 1898, and have proved that its effects upon the finished metal are somewhat similar to those produced by tungsten, but in the case of molybdenum only one-third of the weight is required to produce the same results. As the metal is easily oxidized and volatilized it is best to use it in the form of a ferro-alloy and some of the French electro-metallurgical works are now putting upon the market such an alloy containing from 52 per cent up to 85 per cent of molybdenum, and carbon varying from 2.27 down to 0.34 per cent.

The latter is a refined product, prepared by heating the impure alloy with fresh molybdenum oxide.

As regards value, one ton of 80 per cent ferro-molybdenum is stated by Venator to be worth between $2,150 and $2,550; the Girod works is stated to be producing about 50 tons annually of this alloy. The melting point lies between 1,190 degrees Cent. and 1,400 degrees Cent.

Ferro-Titanium.

Titanium has great affinity for nitrogen, and it is now believed that the amount of nitrogen retained in iron and steel is large, and that this has important effects upon the physical properties of the metal. It has been suggested therefore by Vogt that ferro-titanium should be employed for clearing iron and steel at the moment of casting, exactly as aluminum and ferro-silicon are employed for this purpose. Ferro-titanium is not yet employed however, to any extent in the iron and steel industries, and the fact that titanium holding iron ores, of which enormous deposits exist, cannot be smelted by the ordinary blast furnace method, has created a prejudice against the presence of this metal in iron. The Titanium Manufacturing Co. has however been formed in the United States and has bought land at Niagara Falls for the purpose of manufacturing ferro-titanium, so probably more will be heard of this alloy, and of its utility to the steel manufacturer in the near future.

The Utilization of Ferro-Alloys.

The following extract from an article

contributed by Dr. A. Shadwell to the issue of the Engineering Supplement of the London *Times* for May 27, 1908, may be quoted, in closing this contribution on the subject of ferro-alloys. It is interesting to note that "modern tool steel" is only modern on its name, and that the sword makers of Damascus and Toledo, hundreds of years ago, were practically using steel in the manufacture of their famous weapons as very similar to the steel employed by the English and American tool manufacturer of the present lay.

The quality of the steel depends in the first place upon the ingredients, and secondly upon the treatment. Nowadays the ingredients which may enter into the composition of hard steel are very numerous, and their proportions may vary indefinitely. First there is carbon, and then a string of metals which are or may be used as alloys, in varying portions. The chief are nickel, manganese, tungsten, chromium, vanadium, and molybdenum. Altogether, with the non-metallic elements, silicon, sulphur and phosphorus, steel may contain some 14 or more recognized elements; but some are "impurities" to be got rid of, and others may injure instead of improving the quality. The problem is to get the right ones and in the right proportion for the particular class of steel required. It is a very old problem. Modern "alloy" steel is only modern in the scientific knowledge and handling of it. Some at least of the ingredients occurred in the old steels. The celebrated Damascus steel of Toledo is said to have contained nickel, manganese, chromium and tungsten; and the empirical use of these and other alloys, may very well go back to the remotest period. Steel is essentially a compound, and those who made it in ancient times would naturally hit upon ingredients that would produce a harder steel than others, or one more suitable to a particular purpose, and such empirical knowledge would be handed down. When the subject was taken up scientifically the chemists found the alloys in use, though the makers knew nothing about them. Every maker had his own way of getting the result he wanted, and mixing was a jealously guarded secret. It still is to a considerable extent, though exact chemical knowledge of the constituents and of their proportion, has taken most of the mystery out of it. Every firm has its own formula and makes its own brand, which it stoutly believes to be superior to any other.

THE CHEMICAL CONTROL OF THE BASIC OPEN HEARTH PROCESS[1]

By Alfred Harrison and Richard V. Wheeler

Starting at the outset with the proposition that the basic open-hearth process is essentially a chemical problem, the authors wish in the present paper to indicate how far the chemist[2] can control the process, and to detail a scheme for the complete following of the reactions taking place.

Taking the process of making steel in the basic open-hearth stationary furnace in particular, it will be seen that the major part of the operations are of an entirely chemical character. As an instance the elimination of phosphorus may be taken. The effect of temperature and of the simultaneous removal of carbon upon the rate of removal of phosphorus is, it may be assumed, not fully understood by any one; yet this is a problem which is of vital importance, especially when an attempt is made to tap a high carbon cast without recarburizing. For the chemist to investigate the question properly, and so get the reactions under complete control, it is essential that he should assume entire charge of the operations.

Similarly, the elimination of sulphur can in no way at present be relied upon, and a low sulphur pig iron has to be used if a low sulphur steel is to be obtained. The fact that in the Talbot process large quantities of sulphur are removed during the reaction period, seems to point to the conclusion that a high temperature—the intense heat of the reaction—plays an important part in such removal. Sulphur can, it may be assumed, be removed in at least two ways—either by direct oxidation to sulphur dioxide, or by removal in the slag as manganese sulphide. Considering that the sulphur in basic pig iron exists chiefly as manganese sulphide, the latter would seem the most probable mode of removal. This conclusion is strengthened by the fact that a considerable reduction of sulphur can often be noticed after the addition of ferro-manganese in the ladle, and that when this occurs the percentage of manganese remaining in the steel is less than the theoretical quantity. The following table gives a few instances of sulphur removal in this manner:

Reference.	Sulphur in Tapping Sample. Per cent.	Sulphur in Pit Sample. Per cent.	Difference. Per cent.	Mn. in Tapping Sample. Per cent.	Mn. Added in Ladle. Per cent.	Total Theoretical. Per cent.	Mn. in Pit Sample. Per cent.	Difference. Per cent.
aa	0.045	0.028	0.017	0.165	0.450	0.615	0.555	0.060
bb	0.055	0.035	0.020	0.105	0.500	0.605	0.565	0.040
cc	0.060	0.045	0.015	0.185	0.400	0.585	0.535	0.050
dd	0.055	0.042	0.013	0.170	0.400	0.570	0.525	0.045

All the above cases are chosen from casts where overoxidation of the metal in the bath was not likely to have occurred.

The authors do not propose in the present paper to go more deeply into the question of the removal of impurities in the basic open-hearth process, but they endeavor to show that, apart from any special investigation, the chemist can play a most important part in the routine of the process, and that by systematic records many minor points may be elucidated and much valuable information obtained.

What follows is intended as a framework upon which to base a complete investigation. What have been found to be suitable and accurate methods for the determination of the constituents of the bath during the working of the charge are given while the actual details of the methods themselves will be necessary to the "analyzer" only; yet it is important to give them here, if only for the purpose of showing that simple and rapid chemical methods of testing can also be very accurate.

Inquiry as to the methods in force generally in works reveals the fact that there is considerable difference of opinion as to the extent to which chemical methods of testing should be applied, and that the methods themselves differ widely, both in the manner of carrying them out and in the degree of accuracy aimed at. For the chemical methods described no claim to any particular novelty is advanced (the Eggertz method for carbon has been included for the sake of completeness), but they have been modified and worked out on the lines necessary to ensure speed without impairing accuracy, and it is hoped that

[1]Abstract of a paper presented at the Middlesbrough (1908) meeting of the British Iron and Steel Institute.

[2]The word "chemist" in this paper is used in its broader sense, as a man who interprets results, and devises processes, and not one whose function is simply to analyze. The chemist in the sense here meant is co-ordinate with the engineer.

in their present form they will prove of value either to those already using similar methods, or to such as desire to institute a system of chemical control.

The frequency with which bath-samples should be taken for analysis

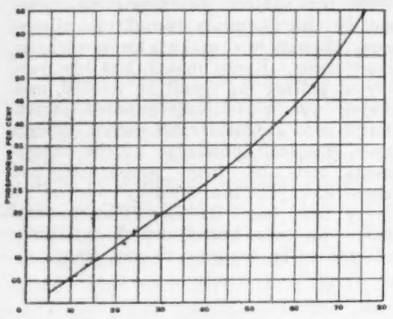


FIG. 1—DILUTION REQUIRED TO SEE THE STANDARD SPOT THROUGH THE SOLUTION (CUBIC CENTIMETERS).

depends largely on the experience and competence of the melter. The most important sample is the "melting-sample" taken before thinning or "opening out" the slag. Many melters are apt to open out too freely with scale and ore, and it may occur that the carbon has all been eliminated in the course of melting, leaving the sulphur and phosphorus still in the bath. Had the melter in such a case had an analysis made before opening out, he could have added pig iron and allowed this pig to open out the slag, instead of using scale, thereby raising the carbon-content of the bath and getting sufficient iron in the slag to facilitate the removal of phosphorus.

After this preliminary "melting-sample," no further sample is of value until the slag is in a good solid (not "heavy") condition, with oxidation of the carbon proceeding fairly briskly. Analyses should then be made fairly frequently.

Analysis on the Melting Stage.

CARBON. *The Eggertz Color Comparison Method.*—A few minor alterations in the method as ordinarily employed are rendered necessary to ensure greater speed, but they do not detract from the accuracy of the results to any appreciable extent.

Weigh off into dry test-tubes (6 inches by ¾-inch) 0.2 gram of the sample, and the same weight of a "standard" steel containing as nearly as possible the same percentage of carbon as the sample. This has to be judged from the previous tests; when the carbon is known to be over 0.40 per cent it is as well, for the sake of speed, to take only 0.10 gram of both sample and standard.

Add 4 c. c. of nitric acid (1.2 specific gravity) and place them in a water-bath till the steel is dissolved, then boil over a small flame until all the brown flocks of iron carbide have gone into solution, and cool; transfer to comparison tubes (13 inches by ¾-inch) graduated up to 40 c. c., each cubic centimeter being divided into tenths. Dilute the standard with distilled water to some simple multiple of its carbon-content, and then dilute the bath-sample until the depth of color appears to be exactly the same as that of the standard when the two are held against a white illuminated background; read off the number of cubic centimeters required to effect this, and divide by the number of times the standard has been diluted; the result gives the percentage of carbon in the sample.

Example:

Carbon in standard = 0.17 per cent.
Diluted in 8.5 c. c. (0.17 × 50).
Sample required dilution to 9.2 c. c. to effect the same depth of color.

$$\text{Therefore } \frac{9.2}{50} = 0.184 \text{ per cent Carbon } \frac{(9.2 \times 2)}{100}.$$

The standard used must be of basic open-hearth steel and the treatment of standard and sample must be identical; the comparison tubes must be of good clear glass, the tubing of exactly equal bore.

SULPHUR. *An Evolution Method.*—Two grams of drillings from the bath-sample to be tested are weighed out and placed in a conical flask of 300 c. c. capacity, fitted with a safety thistle-funnel and delivery tube with catch-bulb. Measure 5 c. c. of a standard ammoniacal copper sulphate solution into a Nessler glass, and dilute up to the 50 c. c. mark with distilled water; dip the delivery tube of the flask into this solution and pour 75 c. c. of boiling commercial hydrochloric acid (2 of acid to 1 of water) down the thistle-funnel; when the sample has dissolved; the contents of the flask are boiled, to expel any sulphuretted hydrogen remaining, and the delivery tube disconnected.

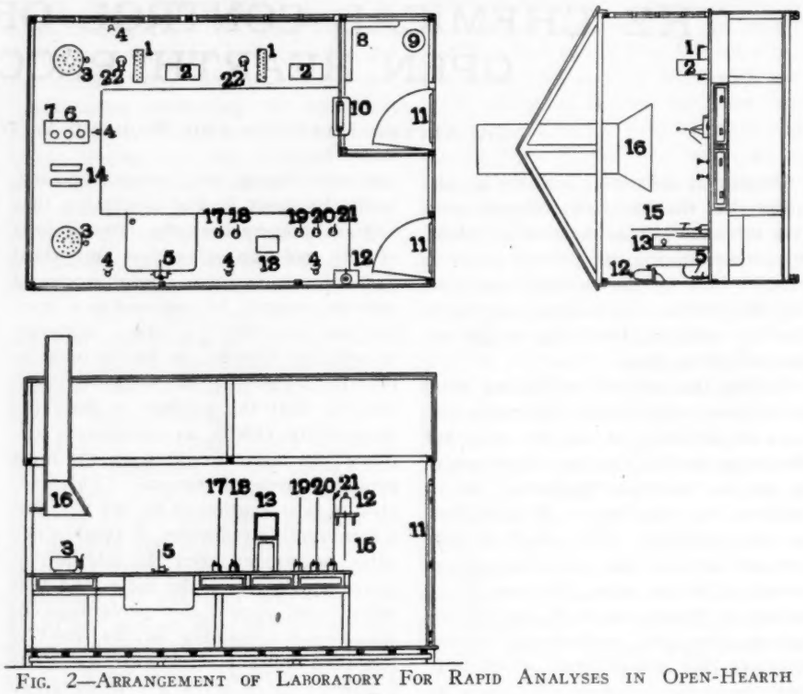


FIG. 2—ARRANGEMENT OF LABORATORY FOR RAPID ANALYSES IN OPEN-HEARTH PLANT.

1—Test Tube Rack. 2—Balance. 3—Water Bath. 4—Gas Tap. 5—Water Tap. 6—Sulphur Evolution Flasks. 7—Hot Plate. 8—Sample Rack. 9—Hand Drilling Machine. 10—Enquiry Window. 11—Door. 12—Distilled Water. 13—Illuminated Screen. 14—Racks for Nessler Glasses. 15—Burette Bottles. 16—Draught Hood. 17—Phosphorus No. 1. 18—Phosphorus No. 2. 19—$CuSO_4$. 20—$AgNO_4$. 21—$Na\ As_2O_4$. 22—HNO_3. (1.2 Sp. gr.).

Two c. c. of strong ammonia are now added to the solution in the Nessler glass; this is necessary in case hydrochloric acid fumes have neutralized the ammonia already present. The percentage of sulphur contained in the steel is estimated by the density of the blue color of the ammoniacal copper sulphate, and by the quantity of copper sulphide precipitated.

The copper solution is prepared as follows:

0.80 gram of pure electrolytic copper foil is dissolved by boiling in a concentrated sulphuric acid, and after cooling made up to a liter with dilute ammonia.

Five c. c. (the quantity taken in the test) of this solution contain 0.004 gram of copper which requires 0.002 gram of sulphur to precipitate it. Two grams of steel containing 0.10 per cent of sulphur will therefore leave no copper in solution when the sulphur is evolved as sulphuretted hydrogen.

By this method it is possible, after a little practice, to estimate the sulphur to within 0.005 per cent. The strength of the copper solution can be varied if necessary to enable higher percentages than 0.10 to be determined.

The evolution method as ordinarily conducted in the main laboratory (viz., evolution into an ammoniacal cadmium chloride solution, and titration with a standard iodine solution using starch as indicator) also lends itself to use on the melting-stage, but the much greater cost of cadmium chloride as compared with that of copper sulphate, renders the latter preferable.

PHOSPHORUS. *A Turbidity Method.*—For this, the most important determination, several methods can be used; that most generally adopted is based upon the amount of turbidity produced by the addition of ammonium molybdate to the steel solution. The process is as follows:

Two solutions are required.

No. 1.

Ammonium nitrate .....400 grams
Nitric acid (1.4 specific gravity)..400 c. c.
Dissolved in one liter of distilled water.

No. 2.

Ammonium nitrate .....100 grams
Ammonium molybdate .....200 grams
Dissolved in one liter of distilled water.

Take 0.20 gram of the sample and of a standard phosphorus steel, dissolve each in 4 c. c. of No. 1 solution and heat over a spirit lamp. Add 4 c. c. of No. 2, heat to boiling and shake violently; dilute and shake each until a black spot on a sheet of paper is just visible through the solutions, and compare the volumes.

Several variants of this method are in use, the chief alteration being in the composition of the solutions used; thus Harbord gives, for No. 1 solution:—

Ammonium nitrate .....400 grams
Nitric acid .....500 c. c.

and for No. 2:—

Ammonium nitrate .....100 grams
Ammonium molybdate ..... 50 grams

made up to a liter with distilled water in each case.

Having had misleading results by using either of these methods, the authors thought it advisable to investigate the influence of variations in the composition of either, or both, of the solutions, and, if possible, to so regulate the manner of treatment as to enable the use of a standard phosphorus steel to be dispensed with; a brief outline of the work done is given here, so that any one using the method as finally worked out may be able to see the necessity, if concordant results are to be obtained, of keeping rigidly to the details both of the preparation of the solutions and the subsequent manipulation.

Variations in the proportion of ammonium molybdate to nitrate in No. 2 solution were found not to cause much difference in the results obtained, so long as there was sufficient nitrate present to prevent the precipitation of molybdic acid; the mode of procedure, therefore, was to keep the composition of No. 2 constant, and vary the concentration and relative proportion of nitric acid to ammonium nitrate in No. 1.

In the following series No. 2 solution contained:—

Ammonium nitrate ..... 80 grams per liter
Ammonium molybdate...100 grams per liter

The results obtained are expressed in cubic centimeters of dilution required to enable a black spot on an illuminated screen to be clearly seen through the solution.

Two samples of steel were employed, in which the carbon and phosphorus had been determined gravimetrically, as follows:

Steel A.

Per cent. Carbon = 0.50 Per cent. Phosphorus = 0.130

Steel B.

Per cent. Carbon = 0.105 Per cent. Phosphorus = 0.076

SERIES I.

No. 2 Solution constant. 100 grams Ammonium Nitrate and 80 grams Ammonium Molybdate per liter.

	No. 1 Solution.		Steel A.			Steel B.		
	Ammonium nitrate, grams per liter.	Nitric acid, c. c. per liter.	1.	2.	3.	1.	2.	3.
A	300	500	Steel does not all dissolve.			31.0	31.5	31.0
B	400	400	45.5	46.0	45.0	31.0	31.0	31.0
C	500	300	Not enough nitric acid present to keep all the molybdic oxide in solution.					
D	140	420	21.0	21.0	21.0	12.0	12.0	12.0
E	125	370	17.0	16.5	17.0	10.0	10.0	10.0

The points brought out by this series are:

1. When the carbon in the sample is fairly high, the concentration of the nitric acid must not be too great, or it will be difficult to dissolve the steel.

2. A high concentration of the ammonium nitrate causes a dense precipitate, not strictly proportional to the phosphorus content. Thus, taking steel A as the standard, if 45.5 c. c. are equivalent to 0.13 per cent of phosphorus, then 31 c. c. should be 0.088 per cent, instead of 0.076 as determined gravimetrically; the results are, however, concordant among themselves for the same sample of steel, and it might be possible, therefore, to construct a curve for different phosphorus content.

3. Solutions containing a smaller concentration of ammonium nitrate give a less dense precipitate (more like the ordinary phosphomolybdate precipitate) more nearly proportional to the phosphorus content; thus, again taking steel A as standard, if 16.5 c. c. are equivalent to 0.130 per cent phosphorus, then 10 c. c. = 0.077 per cent as compared with 0.076 per cent, found gravimetrically. The disadvantage of using a No. 1 solution containing only a small concentration of ammonium nitrate is, that a dilution to 10 c. c. only is required for a steel containing 0.075 per cent of phosphorus. Since 8 c. c. of solution are used in forming the precipitate, this does not allow of anything less than 0.070 per cent being determined, and it is these lower percentages from 0.05 to 0.07 that require to be most accurately reported.

In consequence of this, it was thought best to increase the concentration of the ammonium nitrate, and, from a series of steels of known phosphorus content, to construct a curve and reference table.

The compositions of the solutions finally found to be the best were:

No. 1.

Ammonium nitrate .....370 grams per liter
Nitric acid .....370 c. c. per liter

No. 2.

Ammonium nitrate .....125 grams per liter
Ammonium molybdate ...100 grams per liter[3]

[3]The chemicals used must be the purest obtainable (this applies especially to the ammonium molybdate), and the solutions must be carefully prepared according to the following directions:

No. 1 solution—Dissolve the 370 grams of ammonium nitrate in 500 c. c. of boiling water, add the 370 c. c. of pure nitric acid (specific gravity 1.42), cool, filter, and make up to a liter with distilled water.

No. 2 solution—Dissolve the 100 grams of ammonium molybdate (finely ground) in 800 c. c. of warm distilled water; when all dissolved add the 125 grams of ammonium nitrate, filter and make up to a liter.

A sufficient quantity of this solution should be prepared fresh every three days.

A number of steels (bath-samples) were taken and the phosphorus determined in them gravimetrically; further drillings from these samples were then used for the rapid determination, which was carried out as follows:

0.2 gram of the steel is dissolved in 4 c. c. of No. 1 solution, and then 4 c. c. of No. 2 added. The precipitate comes down at once without any shaking. The mixture is then heated for exactly one minute over a Bunsen burner, and transferred to a special measuring tube of clear glass 1 inch diameter, graduated in c. c. up to 80 c. c. Distilled water is now added till a standard black spot on an illuminated screen can be distinctly seen through the solution. The size of the spot is of no great importance, so long as it is of the same density always. After each addition of water the solution must, of course, be shaken up, to thoroughly mix it and make it of equal density throughout. The volume of the solution is now read, and from the figure thus obtained the percentage of phosphorus can be calculated.

Three determinations of each steel were made by this method and recorded as follows:

SERIES II.

Steel No.	Phosphorus gravimetrically.	Phosphorus by the rapid method, c. c. of dilution required. 1.	2.	3.	Mean.
1	0.054	10.5	10.5	10.5	10.5
2	0.062	11.0	11.0	11.0	11.0
3	0.085	13.5	13.5	14.0	13.75
4	0.100	16.0	16.0	16.0	16.0
5	0.132	22.0	21.0	22.0	21.7
6	0.162	24.0	24.0	23.0	23.7
7	0.192	29.0	29.0	29.0	29.0
8	0.283	42.0	42.0	42.0	42.0
9	0.332	50.0	51.0	50.0	50.5
10	0.420	57.0	58.0	58.0	58.0
11	0.482	64.0	65.0	64.0	64.5
12	0.637	75.0	74.0	75.0	74.7

The curve prepared from these figures is given in Fig. 1. It is intended that the latter should be posted up in the stage laboratory for convenient reference. No standard phosphorus steel is required.

MANGANESE. *A Volumetric Method.*—No standard is required for this method; 0.2 gram of the sample is dissolved in 8 c. c. of nitric acid (1.2 specific gravity) in a test tube 1 inch diameter, and cooled; 10 c. c. of a centinormal silver nitrate solution is then added and about 0.75 gram potassium persulphate, and the test tube placed in boiling water for exactly three minutes. At the end of that time it is taken out and cooled, and then the permanganate solution that has been formed titrated with a centinormal sodium arsenite solution. The end reaction is very sharp, and, if care be taken always to employ the same quantities of reagents and the same length of heating, the results will be strictly accurate.

A table showing the number of cubic centimeters of arsenite solution required to titrate steel solutions corresponding to from 0.05 to 0.45 per cent of manganese is given herewith.

TABLE I.

Sodium Arsenite Required to Titrate Certain Quantities of Manganese.

Sodium Arsenite, Cubic Centimeters.	Manganese, Per cent.	Sodium Arsenite, Cubic Centimeters.	Manganese, Per cent.
0.77	0.050	4.00	0.275
1.55	0.100	4.35	0.300
1.90	0.125	4.70	0.325
2.25	0.150	5.05	0.350
2.60	0.175	5.40	0.375
2.96	0.200	5.75	0.400
3.30	0.225	6.10	0.425
3.65	0.250	6.45	0.450

General Method of Procedure.—The order in which the determinations are made is an important matter where time is of the greatest consequence, and although it is probable that any one adopting these methods would soon see for himself the most time-saving routine to follow, it has been thought best on the whole to give the exact order that has been found to be most convenient.

The standards are weighed out and placed ready in test tubes beforehand, a whole series of carbon standards being thus to hand. When the drillings of the sample are brought in, the first thing that is done is to weigh out the 0.2 gram (or 0.1 as the case may be) for the carbon; as soon as weighed, acid is added to this and to the selected standard, and the two at once placed in the water bath. While these are dissolving, 0.2 gram is weighed out for the phosphorus, 4 c. c. of No. 1 solution added and this also placed in the water bath. Two grams are now taken for the sulphur and the evolution started.

While this is proceeding, the solution for carbon is taken out of the water bath and heated over a small flame till all the brown flocks have dissolved; it is then placed in cold water. The solution for phosphorus is now taken and boiled, 4 c. c. of No. 2 solution added, boiled again for one minute, and put to cool. The carbons are now compared, then the phosphorus estimated, and finally the sulphur (after adding ammonia to the Nessler glass). The three are then reported, on the printed form provided for that purpose, to the sample passer, the three determinations having taken from 10 to 12 minutes from the time the drillings were received. If the manganese is also required, the 0.2 grams necessary are weighed out and dissolved after the sample for carbon has been weighed, and it is estimated last of all; it adds an extra five minutes on to the time required before reporting.

The above scheme assumes that *all* the determinations are required, but towards the end of the heat this will not often be necessary, probably only the carbon and sulphur being required; the manganese also is generally only wanted for the tapping sample, to enable the ladle additions to be calculated, so that it is safe to assume that all the necessary information can be given to the sample passer in under a quarter of an hour from the time the drillings are received.

The Laboratory.

This should be situated on the melting-stage in as central a position as is convenient. Fig. 2, showing the plan and elevation of a stage laboratory designed for a melting-shop of six or eight furnaces, shows the type of building and kind of fittings required. The exact position of every article is, of course, important, since each must be arranged so as to be most readily to hand in the order required by the scheme as given above.

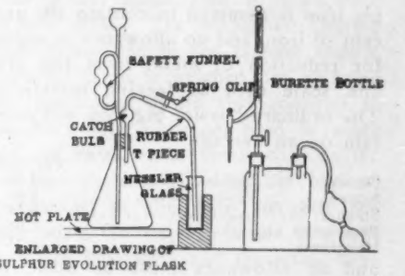


FIG. 3—DRAWING OF SULPHUR EVOLUTION FLASK AND BURETTE BOTTLE.

Form of Report.

A form of report which has been found most convenient is given below. This report is afterwards embodied in the charge record described later, when such is made out

for each individual cast; otherwise it is filed awa[illegible]or reference.

STEEL PLANT.

Furnace No..... Date.....
Heat No.....

BATH SAMPLES.

No.	Time.	C.	S.	P.	Mn.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

PIT SAMPLE.	C.	Si.	S.	P.	Mn.

SLAG SAMPLE.	Fe.	=FeO	CaO.	P_2O_5

Smelter .....
Teemer .....

The Charge Record.

In order to obtain an accurate idea of the working of the plant, it is, in the author's opinion, necessary to do more than merely book the weights of material charged and used and the yield of steel ingots. A system of booking based on the actual metal content of the charge, and including the metal obtained from the ore additions, possesses many advantages which become more and more apparent as the records accumulate and comparisons can be made.

It is, moreover, impossible to estimate the real loss on working if the pig iron is assumed to contain 100 per cent of iron, and no allowance is made for reduction of metal from the ore and scale used as feeding materials. The ordinary "basic" pig iron will contain on an average

	Per cent
Carbon	3.00
Silicon	1.00
Sulphur	0.08
Phosphorus	2.00
Manganese	1.75

and an allowance must be made of about 2 per cent for sand on the pig iron. This gives a total of 9.83—say 10 per cent of material other than iron present; therefore from 100 tons of such pig iron only 90 tons of actual iron can possibly be obtained.

The actual iron content of the scrap will depend entirely on its nature, on the amount of rust, and, in the case of scrap from the slag-hole of the furnace, on the amount of entangled slag. On the other hand, the ore and scale additions, used as feeding materials, will give, on reduction, a certain amount of metal, about 75 per cent in the case of mill-scale, and about 55 per cent in the case of ore.

Reference to Figs. 4 and 5, which show the records of two typical charges, will show clearly the manner in which this system can be applied. When the actual metal content of the charge has been calculated, as shown in these two examples, a deduction must be made from the weight so obtained for metal irrecoverably lost in the slag as iron oxide (this is calculated from the percentage of iron found by analysis and the weight of slag made); the difference will then be the actual weight tapped from the furnace: any difference in weight between this and the weight of ingots cast will show the "recoverable" loss—*i. e.*, pit scrap, skull, or metal remaining in holes in the furnace-bottom, or splashed out into the slaghole. This figure in particular, provided, of course, that the system of weighing-in material is good, gives a valuable indication of the working of the plant.

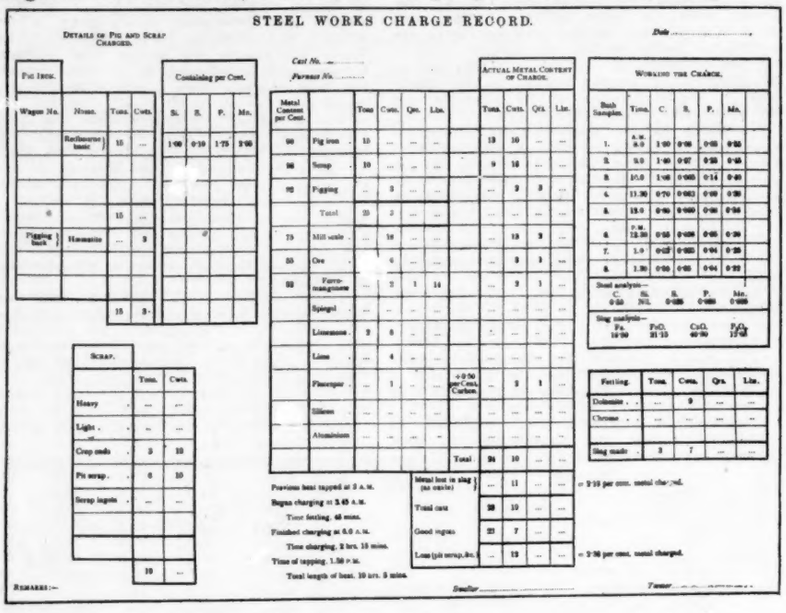

STEEL WORKS CHARGE RECORD.

FIG. 4—TYPICAL STEEL WORKS CHARGE RECORD.

It is not intended that such a record should be made for each separate cast; only in exceptional cases is this necessary; ordinarily it is sufficient if the week's run of each furnace is reported on separate sheets. The extra information obtainable by this mode of record fully compensates for the extra labor that may be involved in making the necessary calculations. By the use

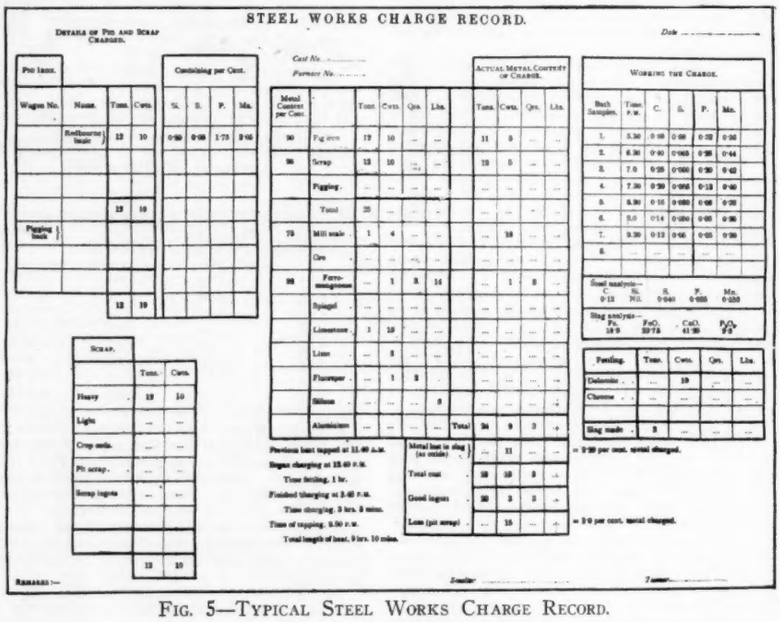

STEEL WORKS CHARGE RECORD.

FIG. 5—TYPICAL STEEL WORKS CHARGE RECORD.

of suitable tables the work of calculating the actual metal content can be reduced to a minimum, and, since this constitutes the main departure from the ordinary type of charge record, very little extra time need be spent on the whole report.

In the two heats recorded in this paper, bath samples were taken at more frequent intervals than is ordinarily required, and analyzed subsequently in the main laboratory. The results have

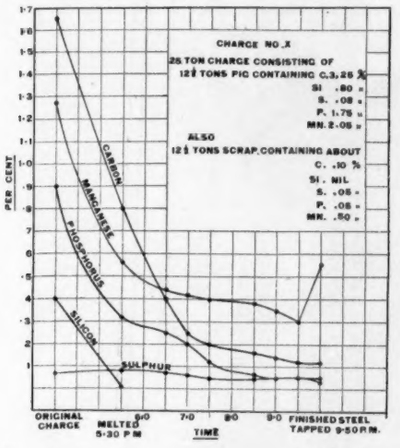


FIG. 6—RESULTS OF ANALYSES OF CHARGE IN FIG. 4, MADE AT DIFFERENT TIMES IN HEAT.

been plotted out on curves (Figs. 6 and 7), showing the rate of disappearance of the impurities.

It will be observed that the rate of removal of manganese is neither so rapid nor so complete as is currently believed; in other charges as much as 0.346 per cent of manganese has been left in the bath at the end of the heat, and in no instance is there any record of its falling below 0.12 per cent. This fact renders it desirable always to estimate the manganese in the tapping sample on the melting-stage, and to regulate the ferro addition in the ladle in accordance with the result obtained, if a regular composition of steel is required.

Table II.

Limestone or Lime Required per Ton of Pig Iron Charged.

Silicon, Per cent.	Limestone, Cwts.	Lime, Cwts.
0.50	1.95	1.10
0.75	2.40	1.35
1.00	2.85	1.60
1.25	3.30	1.85
1.50	3.75	2.10
1.75	4.20	2.35
2.00	4.65	2.60
2.25	5.10	2.85
2.50	5.50	3.10

Table III.

80 Per Cent Ferro-Manganese to be Added in the Ladle to Give the Required Percentage of Manganese in the Steel Above that Remaining in the Bath.

Manganese, per cent.	80 per cent ferro, Lbs. per ton of metal.
0.200	5.6
0.225	6.3
0.250	7.0
0.275	7.7
0.300	8.4
0.325	9.1
0.350	9.8
0.375	10.5
0.400	11.2
0.425	11.9
0.450	12.6
0.475	13.3
0.500	14.0
0.525	14.7
0.550	15.4
0.575	16.1
0.600	16.8
0.625	17.5
0.650	18.2

Table Showing the Number of Cubic Centimeters of Dilution Required for Certain Percentages of Phosphorus.

Dilution, Cubic Centimeters.	Phosphorus, Per cent.	Dilution Cubic Centimeters.	Phosphorus, Per cent.
10	0.05	35	0.230
11	0.06	40	0.265
12	0.07	45	0.305
13	0.08	50	0.345
14	0.085	55	0.390
15	0.095	60	0.440
16	0.100	65	0.480
20	0.125	70	0.560
25	0.160	75	0.640
30	0.200		

Calculating the Charge.

Table II shows the quantity of limestone necessary to flux the silicon in the pig iron for a silicon content of from 0.50 to 2.50 per cent. Allowance has been made for 2 per cent of sand on the pig iron used. The necessity of such a table is well illustrated by an instance that came to the authors' notice, where only 12 hundred-weight of burnt lime was added to a 20-ton charge containing 9 tons of pig iron that was known to contain over 2 per cent of silicon. The effect on the furnace banks and bottom was, of course, disastrous. A similar table for lime additions, where this is preferred as a basic material, is also given.

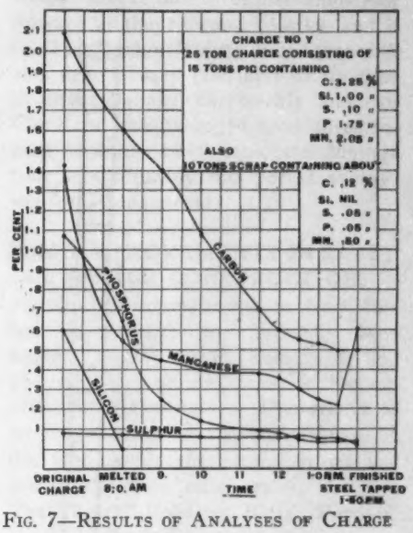


FIG. 7—RESULTS OF ANALYSES OF CHARGE IN FIG. 5, MADE AT DIFFERENT TIMES IN HEAT.

Ferro-Manganese Addition.

Table III gives the weight of 80 per cent ferro-manganese that must be added per ton of metal, in order to obtain certain percentages of manganese in the steel. The manganese having been determined in the tapping sample, sufficient ferro is weighed out to bring the percentage up to that required in the steel. No allowance need be made for the extra metal obtained from the ore and scale used, since the loss of manganese in the bath between the time when the tapping sample was sent in to the laboratory and the actual time of tapping counterbalances this.

AN OVAL BLAST FURNACE AT THE NEWPORT IRONWORKS, MIDDLESBROUGH, ENGLAND

BY FREDERICK C. COLEMAN

In the manufacture of pig iron, it is an old story that in America, under the pressure of the rapid development of the industry, the design and manipulation of the blast furnace were altered from time to time to obtain large outputs. This was done almost irrespective of cost. The price paid for modernized American blast furnace plants was enormous, and though British ironmasters were some few years ago aroused from their slower going methods by the success which was attained in American practice, yet, with few exceptions, they have been content to improve existing plants, or build new ones of a less costly description, which were destined to meet the requirements of manufacturers in that country. But these new plants are costly in comparison with those of older date, and it is not often wise to scrap a fairly good plant of an older type in order to replace it by one of greater cost, simply for the sake of getting larger output.

Leaving for the moment the question of labor saving, there are three essentials in a plant designed for large output. First, the necessary area in the melting zone of the furnace, or that area about the tuyeres where the oxygen of the air blown in is brought

in contact with the fuel in the furnace. Second, capacity of the blowing engines which involves both the necessary volume and pressure of blast. Third, stove power or sufficient capacity or area of stoves to heat up the required volume of air to the required temperature. To obtain the first essential, in the United States the diameter of the furnace at the tuyeres was increased, with the result that it was necessary to increase the power of the blowing engines to obtain the higher pressure of blast necessary to penetrate the increased mass of ore in the shaft of the furnace. It is well known that if the mass is not thoroughly penetrated by the blast, a center core remains unmelted, which prevents the making of good iron, and moreover, adds to the consumption of fuel. This increased pressure leads up to the third essential of more strongly built and more costly stoves. Increased capacity as regards dealing with volume of air necessary for increased output is necessary in both blowing engines and stoves. But the great cost which it is sought to avoid is the tremendous strength of the blowing engines, which increases with the pressure of blast required, and which adds to the cost of the engines to a serious and alarming extent, and also to the cost of the stoves, air mains and adjuncts, because of the strength required to withstand the increased pressure. A blast pressure of 5 to 6 pounds per square inch was usual under the older designs, while 12 and 15 pounds or more, is common with the later American practice.

For the purpose of obtaining the increased tonnage without incurring the increased cost of plant, a furnace of oval shape, designed and patented by Francis Samuelson and William Hawdon, of Middlesbrough, has been put into blast at Sir B. Samuelson & Co.'s

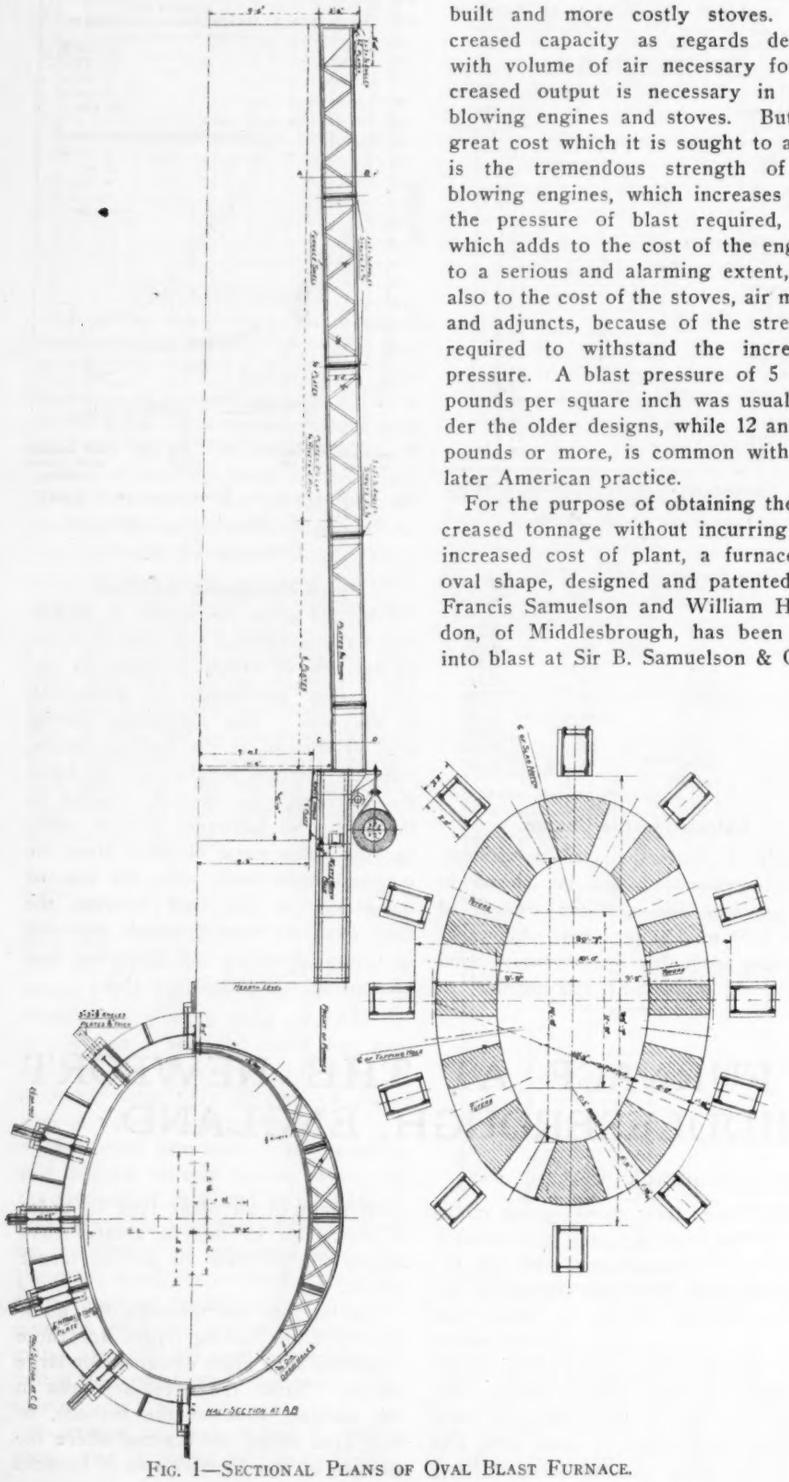


FIG. 1—SECTIONAL PLANS OF OVAL BLAST FURNACE.

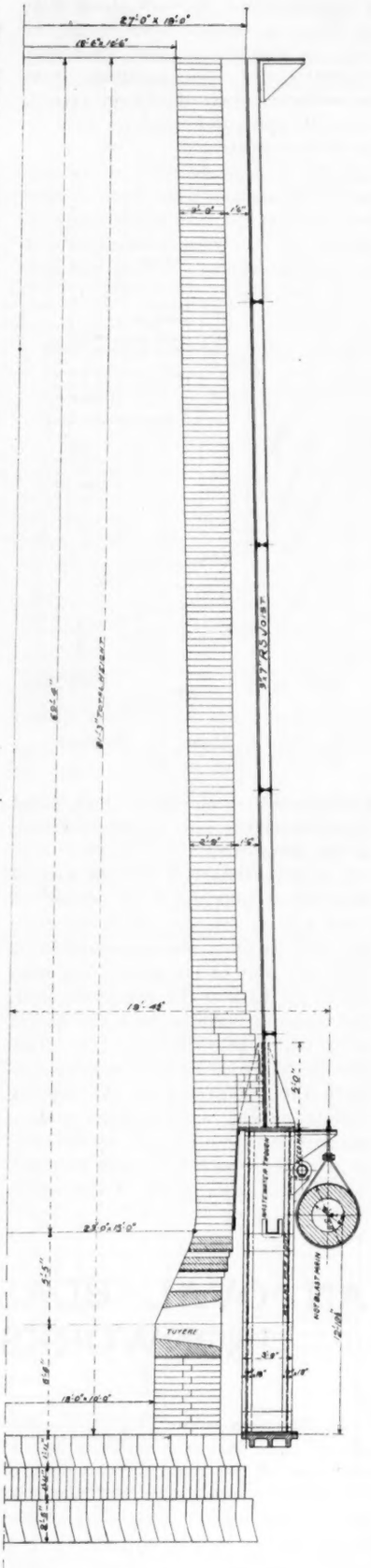


FIG. 2—HALF SECTION OF OVAL BLAST FURNACE.

Newport Ironworks, Middlesbrough, England, and forms one of the most important examples of new manufacturing methods and improved types of machinery seen by the members of the Iron and Steel Institute on the occasion of their recent meeting at Middlesbrough. It is of importance to note that, with the single exception of the furnace stack, nothing has been altered in the plant. In order to strengthen the oval form against the pressure of materials inside the furnace, girders composed of 9-inch beams at the ends and increased to 4 feet 7½ inches deep lattice girders at the sides are placed both vertically and around the shell. The furnace is blown by the old blowing engines, and works on a blast pressure of 6 pounds per square inch with very great regularity, and with satisfactory results as regards fuel consumption, and output. It is obvious that an engine blowing 15 pounds per square inch requires about 2½ times the horsepower of an engine blowing 6 pounds per square inch, and also requires 2½ times the boiler capacity, all of which means increased cost of plant and repairs. Hence, well on to 50 per cent of the horsepower required for the production of the higher blast pressure is saved in the low pressure, and this power is available for generating electric, or other power, for other purposes. The adoption of the oval type, whether in an old or new furnace plant, is productive of this valuable saving of power. The great regularity in the quality of the iron is also of great benefit to the steel worker, and the large makes, with a satisfactory saving in coke consumption, from a comparatively cheap plant, are a welcome asset in the manufacture of pig iron. The charging bell is oval in shape, and this gives an equal distribution of materials at the top of the furnace, which is maintained throughout the smelting process. A certain amount of doubt was expressed at first as to whether the oval shape would work with as great regularity as the circular form, but this has been quite set at rest by the very regular working of the furnace, less trouble having been experienced with it than probably any other furnace at the Newport Works, and it has been authoritatively stated that with this new furnace (the first of its type in Great Britain) the weekly make of Cleveland iron averaged, over three recent months, 1,344 tons, the highest four weeks during this period averaging 1,447 tons weekly.

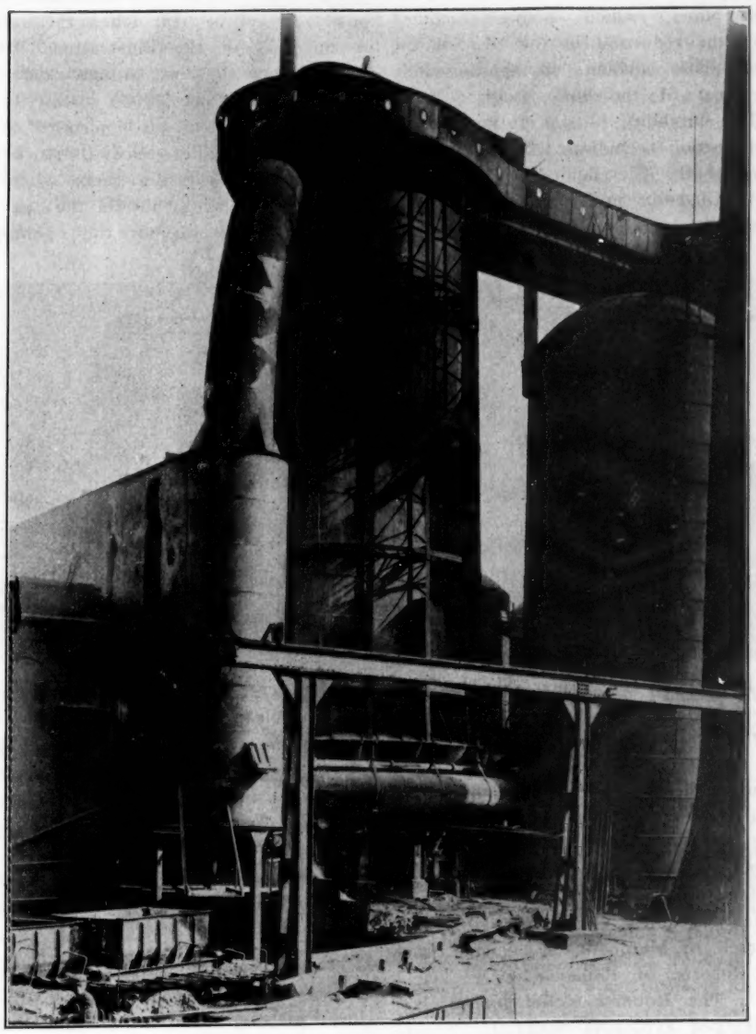


FIG. 3—OVAL TYPE OF BLAST FURNACE AT SIR B. SAMUELSON & SON'S NEWPORT IRON WORKS, MIDDLESBROUGH, ENGLAND.

SOME IMPROVEMENTS IN BLAST FURNACE CONSTRUCTION.

Two new improvements in blast furnace construction have recently been brought out by F. C. Roberts & Co., Philadelphia, and are shown in the accompanying illustrations. One relates to an improvement in the construction of the bosh, while the second is an improved form of relief valve.

The Farrell-Roberts Blast Furnace Bosh Construction.

The experience of the last few years with blast furnaces operating under high pressure and rapid driving has demonstrated the necessity for great care in the designing of the furnace bosh when equipped with cooling plates. Accidents have occurred, involving loss of life in certain instances, by the failure of the bosh construction. Again, it is the experience that, after a furnace equipped with bosh plates has been in blast for some time, difficulties are apt to develop in connection with those plates by reason of the brick work between the plates becoming worn on the inside of the furnace, thus allowing the inner ends of the bosh plates to settle, displacing their water connections and rendering their removal a difficult matter. Furthermore, it is by no means generally conceded by furnace managers that the bosh plate forms the best bosh protection, some preferring a bosh jacket with a thin lining of fire brick, the aim and object of the latter design being to save expense, secure ample strength and maintain smooth and uniform bosh walls.

It may be assumed, however, unless the number of rows of bosh plates is excessive, that there is less heat extracted from the furnace by the circulating water in the bosh plates than is lost through the bosh jacket, and that for rapid driving and large products, the

former is preferable to the latter. It would therefore appear that a bosh design which would combine the merits of both types, provide a construction which would maintain the thickness of the brick walls, securely hold the bosh plates in position and at the same time insure against serious accidents, should solve the problem.

It is thought that the design of bosh shown in Fig. 1 fulfills these requirements. As indicated, it consists of a bosh jacket extending from the mantel

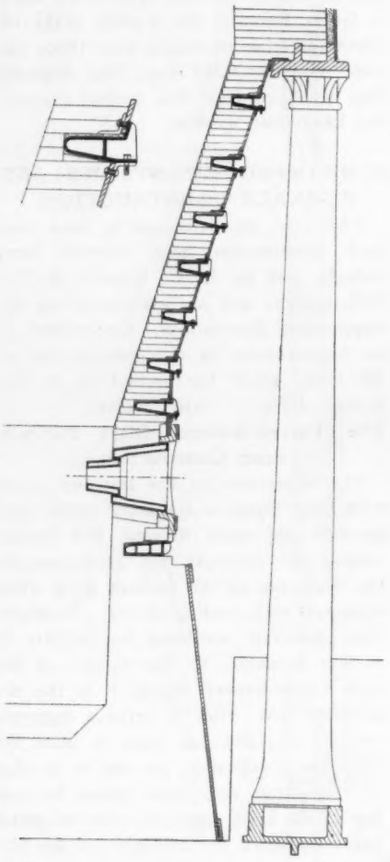


FIG. 1—FARRELL-ROBERTS BLAST FURNACE BOSH CONSTRUCTION.

to the top of the hearth; openings are provided in the jacket for the bosh plates with an angle section band above the openings on the inside and a similar angle section band below the opening on the outside, the angles both above and below extending around the jacket. The openings are slightly larger than the bosh plates and the latter are constructed with a lip on the upper side bearing against the jacket and a flange on the lower side which is bolted to the outer angle on the jacket. This construction permits the ready removal of the bosh plates and securely holds them in position when the brick work is worn away. In the illustration the bosh brick work is shown as 13½ inches thick and the bosh plates as extending 9 inches within the jacket.

Attention is called to the fact that the cost of this construction is not more than that of an ordinary bosh equipped with bosh plates, while the strength and freedom from danger is much greater. The brick work is less expensive by reason of the thin walls and absence of arches or other special supports for the brick work over the bosh plates, which saving, combined with the reduction in the cost of the bosh plates amounts to approximately the cost of the bosh jacket.

The durability of this form of bosh construction is indicated by the experience of the Cleveland Cliffs Iron Co., at its Gladstone and Marquette furnaces, where a somewhat similar construction is in use. In the former case, the furnace has been in continuous operation for seven years and nine months and in the latter case for over five years. One of the large furnaces of the Wharton Steel Co. at Wharton, N. J., is being equipped with a bosh of this design.

This bosh construction is covered by patents granted individually to Austin Farrell, of Marquette, Mich., and Frank C. Roberts, of Philadelphia.

The Roberts Relief Valve.

Hinged explosion doors at the tops of blast furnaces and downcomers are rapidly becoming displaced by relief valves of large diameter, arranged to open automatically, when the top pressure becomes excessive owing to "slips" or explosions. It has been found, however, that when "slips" or explosions take place large quantities of coke, ore and limestone are frequently discharged through the relief valves, a result which causes much annoyance and expense and sometimes endangers life. The illustrations show two forms of relief valves designed to overcome this objection. In both cases the valves proper are inverted cones resting on removable seats and attached to the ends of counterweighted levers. In one the bottom of the valve carries a series of prongs with spaces between and of such length that the lower ends are not exposed above the seat when the valve is open. In the other case there is attached to the valve a heavy screen open at the bottom and of such length that the bottom of the screen is not exposed above the seat when the valve is open as in the illustration. The spaces between the prongs and in the openings in the screen are of such size as to permit only the gas and smaller pieces of stock to be discharged through them when a "slip" takes place. Should the spaces between the prongs or the openings in the screens become clogged they can be cleaned from the outside by raising the valve to the desired point above the seat. The valve with the prongs is in use at the plant of the Warwick Iron & Steel Co. of Pottstown, Pa.

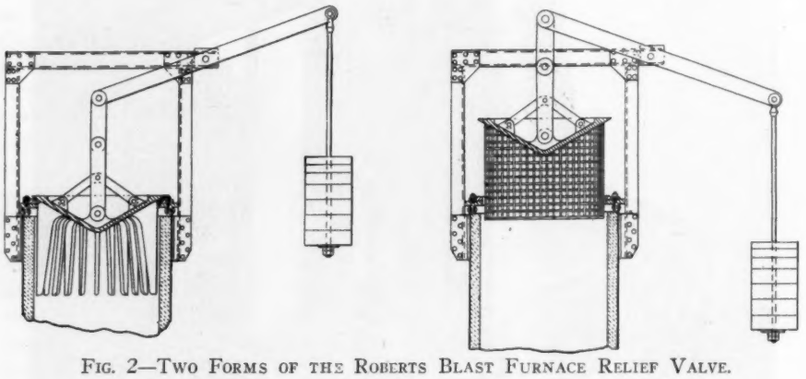


FIG. 2—TWO FORMS OF THE ROBERTS BLAST FURNACE RELIEF VALVE.

These valves are designed and patented by Frank C. Roberts, Philadelphia.

Coal Statement.—The statement of the Pittsburg Coal Co. and subsidiary concerns for the nine months ending Sept. 30, 1908, shows a falling off in the production of coal and coke and a heavy decrease in earnings. The gross earnings were $2,106,791 and the net earnings $135,227 compared with the gross earnings of $4,207,364 and net earnings of $2,109,049 during the same months of 1907. The statement on coal and coke production is as follows'

	Nine months ended Sept.30,'08.	Nine months ended Sept.30,'07.	Decrease.
Coal—	Tons.	Tons.	Tons.
Pitts. dist.....	9,726,387	13,302,634	3,576,247
Hock. dist. (O.)	773,588	1,018,481	244,893
Totals	10,499,975	14,321,115	3,821,140
Coke—			
Pitts. dist.	5,370	382,205	376,835

THE NEW "STEP PROCESS" FURNACE AT IRON MOUNTAIN, MICH., FOR SMELTING ORES

The new "step process" of reducing metals from the ore, invented by John T. Jones, of Iron Mountain, Mich., has been much discussed. The following is the first information to be given out authoritatively concerning this process and the furnace that has been designed to carry it out. Up to this time, all of the operations of the furnace have been purely experimental both as regards the mechanical and chemical propositions to be worked out. These experiments have not involved the principles upon which the process is based but have had to do with the regulation of temperatures, speeds and gearing, and the character and operation of the gas producer. Now it is claimed that a sufficient tonnage of ore has been successfully put through the furnace to establish the correctness of the principles involved, the economy and practicability of the process and the rate at which the product may be shipped.

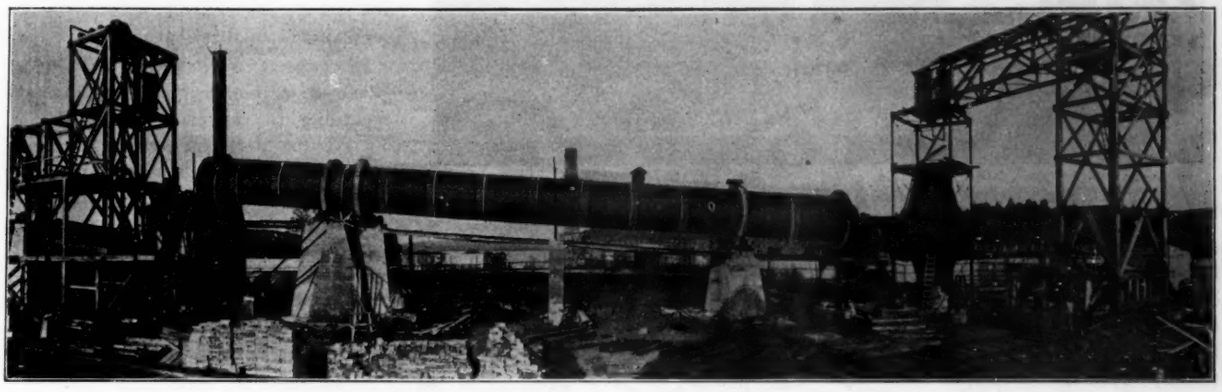


FIG. 1—GENERAL VIEW OF THE "STEP PROCESS" FURNACE AT IRON MOUNTAIN, MICH.

The character and arrangement of the plant as shown in Fig. 1, comprises principally a horizontal rotating furnace and a gas producer. The process consists of the reduction of the metallic oxides of any ores to the metal and applies therefore to copper or zinc oxides as well as iron. As applied to iron ore for the reduction of which this furnace was particularly designed, the process yields a product which may either be charged into an ordinary "balling" furnace and thence to the familiar squeezing rolls and blooming mill to be made into muck bar, or it may be put into the open-hearth furnace, in place of scrap, to be manufactured into steel. The plant now erected and the operations so far carried out have to do only with the metallizing of the iron oxide, Beyond this step the operations are not new and have been successfully conducted for a long time. In the future of the project, it is expected to bring to this plant the other operations and ship, from the immediate vicinity of the ore mines, only the finished product. The commercial success of the undertaking therefore carries with it, if it materializes, very great possibilities.

The furnace consists of a steel tube 8 feet diameter and 120 feet long, lined with fire brick and very similar to the ordinary cement kiln. It is mounted almost horizontally with a slight inclination toward the discharge end to aid in the movement of the ores. The tube is equipped with two bearing rings and is supported on rollers mounted on concrete piers as shown in Fig. 1. A spur gear ring encircles it by means of which and a train of gears driven from an electric motor, the furnace is rotated at the rate of one revolution a minute. The ore is brought in on a railroad spur which parallels the furnace and is dumped from hopper bottom cars into the boot of an elevator which raises the ore into a head frame at one end of the furnace. Here it is discharged into a rotating screen with a one-quarter inch mesh. That which passes the screen is ready for charging into furnace and the lumps are carried up to a crusher which breaks them down to the same size. The ore thus prepared is charged into the kiln.

At the other end of the furnace the gas producer is erected. This is shown in Fig. 2. It is an ordinary water sealed gas producer using any kind of bituminous coal and evolving a rich hydro-carbon gas. The framework shown is simply a support for the charging device for the gas producer. This hydro-carbon gas is admitted into the end of the kiln in excess. Air is admitted through a slip ring or bustle pipe which encircles the kiln close to this end. The mixture results in a combustion which produces the necessary heat in the kiln and the excess hydro-carbons reduce the oxide in the ore. The reactions are similar to those in the upper zones of the blast furnace except that the source of the carbon is different and, in the experiments so far, the temperatures have been about the same. It is understood, however, that some developments have operated to suggest a change in the temperature at which this reduction can be brought about. The operation in this furnace does not go far enough to carburize the metal and the product is practically as free from carbon as was the ore.

The product in appearance is similar to some specimens of sintered blast furnace dust. It is hard and porous and when worked with a file shows clearly the metallic character of the sponge iron. In the product the metal is intimately associated with the gangue of the ore, largely silica. This is not affected by the process, but it has been found consistently that the phosphorus content is reduced in the operation. No explanation of this phenomenon is attempted. While sulphur is not at all troublesome in Lake Superior ores, it could be easily roasted out at the temperatures under which the kiln operates. The ore that has been used came from the Mitchell mine on the Marquette

range. This is a high grade ore and the silica content of such ore would have but little importance whether the product were used for making iron or steel. One of the possibilities which this process is expected to develop, however, is the use of low grade, high silica ores. This kind of ore running in the neighborhood of 40 per cent in iron and 30 per cent in silica abounds in the immediate vicinity of Iron Mountain and Antoine, where the furnace is located, and a large percentage of the ores of the eastern end of the Menominee range are of like character. The promoters of this furnace have secured an interest in the ores of the Randville district, a high silica territory only a few miles from Iron Mountain, so that the freight on the ore delivered at the furnace should be not over half of the rate now charged for hauling from the mines to Escanaba. The crushing of the ore also, for this furnace is no more than has to be done with a number of the ores from this district now, in shipping for blast furnace use.

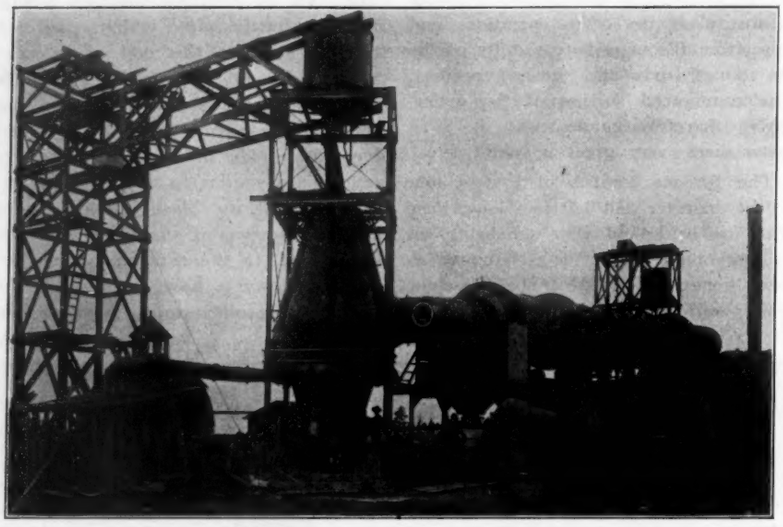


FIG. 2—GAS PRODUCERS FOR "STEP PROCESS" FURNACE.

With a large percentage of silica in the ore, however, there will be a corresponding percentage of this furnace product to be slagged off in the "balling" furnace. This will undoubtedly carry off some iron with it, just how much is a question, although this trouble would seem quite possible of remedy. Where the product is to be used for charging into open-hearth furnaces, the silica will be most objectionable and the added cost of treatment either by a compound acid-basic operation or otherwise is problematical.

A comparison of costs can only be approximate and none is offered. It is estimated, however, that a ton of coal will reduce 10 tons of 40 per cent ore by this process, which is a coal cost of about 40 cents per ton of product. It should be possible to charge the ore into the furnace for 90 cents, this cost to include mining, royalty, transportation, crushing and handling. Allowing 10 cents for all other charges, it appears to be fair to estimate the cost of this product at less than $1.50 per ton. If this product can take the place in the manufacture of muck bar and steel that is claimed for it, it is very apparent that even at plants far removed from Iron Mountain, pig iron and scrap, respectively, can easily be supplanted in these processes.

In general, the "Ardis Furnace," which is the name given to it, will, according to the claims made for it, obviate the need of steel making pig iron and the blast furnace producing it, and it will by the further cheapening of steel manufacture, hasten the decline of the Bessemer converter. It will render unnecessary the decarburizing portions of all steel making processes and, most important, it will result in the restoration of wrought iron to common use.

J. C. Buckbee & Co., Chicago, are the constructing engineers for the plant and the furnace, crusher and driving motors were built by the Allis-Chalmers Co. Current for driving the motors, which are five in number and respectively 75, 40, 30 and 5 horsepower in size, is supplied by the Iron Mountain Electric Co.

A DIFFICULT SHAFT SINKING OPERATION AT DEERWOOD, MINN.

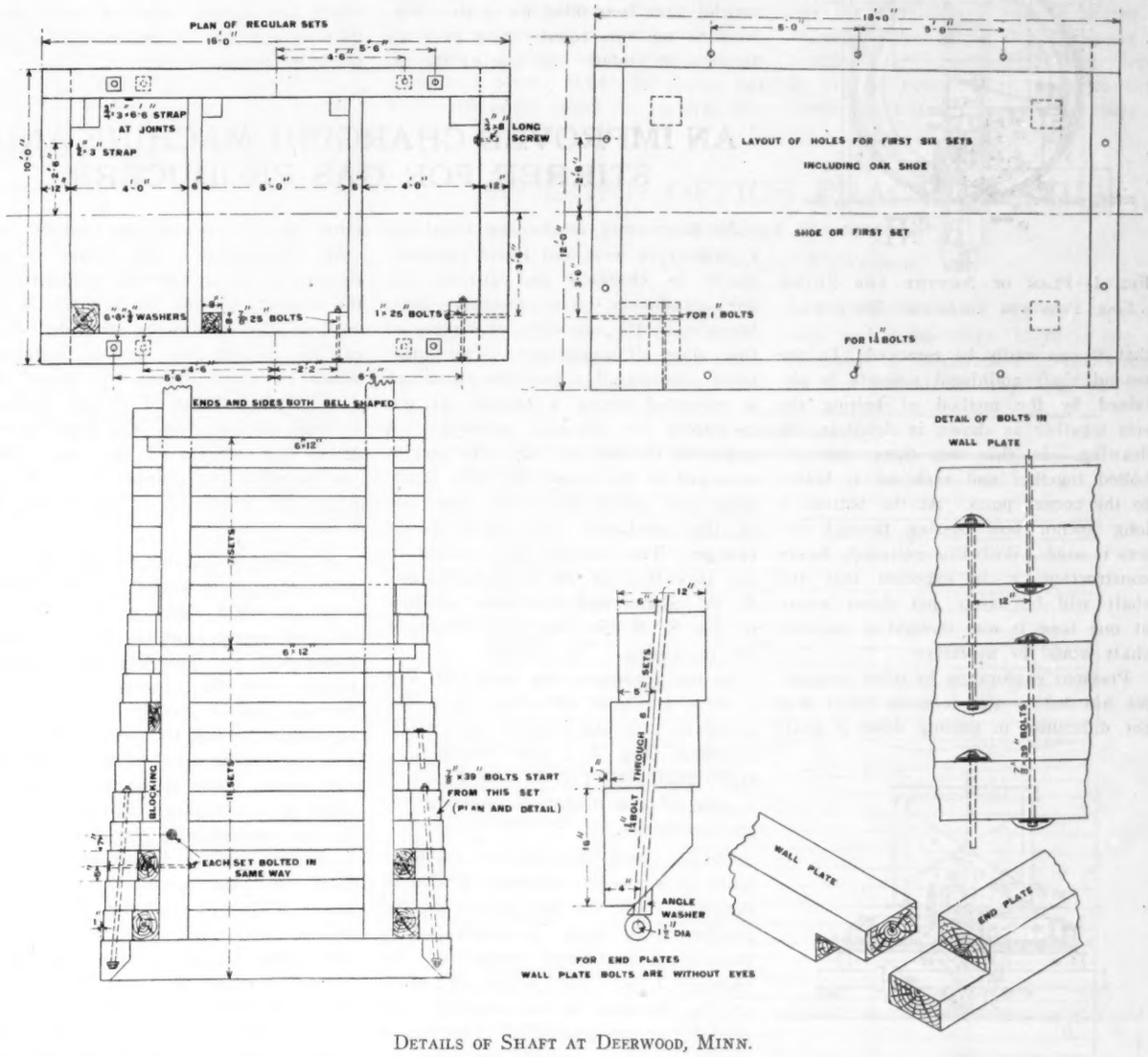
After a year of uncertainty, the Rogers-Brown Ore Co. has succeeded in putting down a timber shaft to ledge on its Cuyuna range exploration at Rabbit Lake and is engaged, though work is temporarily suspended, and may be entirely abandoned because of the large quantity of water, in sinking a second shaft several miles to the south. The first options taken by the Rogers-Brown Ore Co. were in section 30-47-28 on the south shore of Rabbit Lake on property which had been drilled and released by the Oliver Iron Mining Co. This company also started a shaft, but it caved in after a depth of about 25 feet had been reached. While drilling after it had taken up the options, the present lease holder started an exploration shaft less than 100 feet south of the Steel Corporation shaft in order to test the surface. This was put down to a depth of about 50 feet and is still intact with 10 or 15 feet of water in the bottom. With such information as this work had afforded added to that shown up by the drills, a permanent shaft was started still farther to the south, so located as to best reach four contiguous forties held under option from different interests. The shaft dimensions were 10 feet by 16 feet outside of timbers and the design as finally developed during the progress of sinking is shown in the accompanying sketch. Expecting to find the job a wet one with a considerable depth of quicksand, the plan was to put down an ordinary drop shaft. After going through 4 feet of black muck, however, 20 feet of white clay was encountered, followed by 30 feet of clay and gravel and 3 feet of red clay. All of this material, while too solid for drop shaft methods, was scarcely firm enough for

simple sinking and it was an exceedingly difficult matter to keep the shaft lined up. By adopting the plan of building the shaft solid with 12 x 12-inch Washington fir sets and by jacking the bottom sets down, the shaft was finally put through this material into a 15-foot stratum of hard pan. In the corners, for uprights, 8 x 8-inch oak timbers were used and the sets were reinforced with ½ x 3-inch iron straps, running vertically, the straps being fastened to each set with ¾ x 8-inch lag screws. The dividers were 6 x 12-inch timbers.

The hard pan itself was not a difficult proposition and the work reverted to ordinary shaft sinking methods and putting in the sets as the shaft went down. At the end of the 15 feet, however, the hard pan suddenly disappeared, to be replaced by a fine black sand and 10 feet of the finest quicksand, for about the same depth. The rush of sand and the pressure nearly spoiled the 70 feet of work. By bracing the shaft strongly, weighting and dropping it quickly, it was saved without much distortion and brought up on another streak of hardpan, which proved, however, to be only a foot thick followed by 2 feet more of quicksand. The remainder of the sinking down to ledge at a depth of 112 feet was through a mixture of clay and hardpan and was accomplished by jacking down the bottom sets. When ledge was reached, it was found to dip so that in the length of the shaft it was found that the footing on one side was 4 feet lower than on the other. As the shaft had not yet been permanently hung from the top, being a drop shaft, this might have proven more or less serious, but with the bracing at the bottom, and the stiff construction, it hung until safely secured.

The second shaft, of which the accompanying drawing is more exactly a sketch, is different from the Rabbit Lake shaft in that 12 x 12-inch Washington fir 40 feet long is being used for corner posts instead of the smaller section oak pillars. This shaft is located in section 30-46-28 to the south of Deerwood, or about eight miles from the other, and, from the indications shown after sinking to a depth of about 55 feet, a more uniform character of ground will be encountered, than in the other shaft. Down to the present depth the ground has been sand and gravel, but the last 90 feet will be sand and it is expected to be a straight drop shaft proposition. Much more water would have to be pumped here, however, than at Rabbit Lake. When work was stopped several weeks ago, the pumps were handling 1,200 gallons a minute, which is more than twice as much as came into the other shaft.

To take advantage of the weight of the surrounding sand in dropping the shaft, the bottom 12 sets, not counting the oak shoe, are built with an offset of



DETAILS OF SHAFT AT DEERWOOD, MINN.

1 inch on all sides for each succeeding set, so that the outside dimensions at the bottom are 2 feet larger in both directions. Instead of using only the oak shoe, a steel plate shoe is bolted with straps on the bottom sets, so

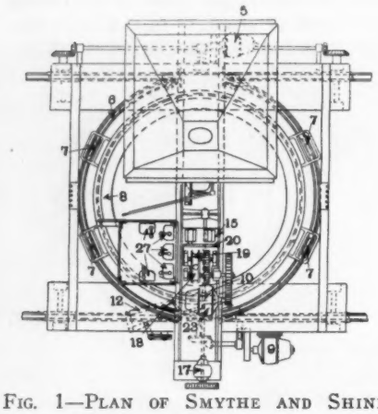


FIG. 1—PLAN OF SMYTHE AND SHINN GAS PRODUCER CHARGING MACHINE.

that it can easily be removed. In the second shaft additional strength is obtained by the method of bolting the sets together as shown in detail in the drawing. In this way three sets are bolted together and each set is bolted to the corner posts. At the bottom, a long anchor bolt passing through six sets is used. With this extremely heavy construction, it is expected that the shaft will be safely put down where at one time it was thought a concrete shaft would be necessary.

Previous exploration by other companies has led to the common belief that the difficulties in putting down a shaft

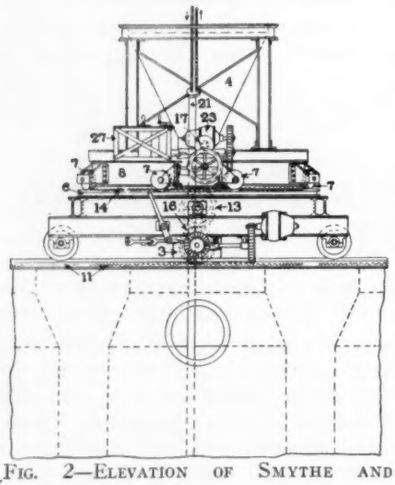


FIG. 2—ELEVATION OF SMYTHE AND SHINN GAS PRODUCER CHARGING MACHINE.

would not end the troubles to be encountered in mining in this district. It is, of course, very wet throughout the district and if the formation lets the water through readily, it will mean heavy pumping charges. Such ore as has been found recently is undoubtedly better, however, than has been commonly thought to exist in quantity on this range and if the ledge so far shown up is a criterion from which to judge the character of the ore bearing ground the problem of mining may not prove so difficult as has seemed probable. It is interesting to note that incorporation articles have been filed for a new railroad to tap this country and have its terminal at Duluth. As one of the incorporators is the owner of most of the land in the ore bearing district and is interested in some of the most promising leases, the very apparent objective of the new road is ore traffic. Some very interesting speculation is possible, should this road be built, with regard to the future freight rate on iron ore in Minnesota from the mine to lake port. The new road would enter into direct competition with the Northern Pacific road, which has already surveyed spurs into the mining properties, and is itself interested in several leases.

AN IMPROVED CHARGING MACHINE AND STIRRER FOR GAS PRODUCERS

An interesting mechanism involving a number of new and novel improvements in chargers and stirrers for gas producers, has recently been brought to the attention of buyers of this class of equipment. The apparatus consists of a movable car which is operated above a battery of gas producers for charging purposes. A poker is carried on this car and is arranged to be introduced with a circular and radial movement into any of the producers for agitating the charge. The charger and stirrer is the invention of H. E. Smythe and E. W. Shinn, and has been assigned to the S. R. Smythe Co., Pittsburg, for marketing.

In the accompanying drawings, Fig. 3 is a sectional elevation of a gas producer with the charger and stirrer attached; Fig. 2, a side elevation at right angles to Fig. 3, and Fig. 1 is a plan of the invention omitting the gas producers.

In Fig. 3 on top of the producer body is a circular channel, 1, constituting a track for the wheels of the producer top plate 2, which has a circular down-turned flange in the channel 1, so that water or other sealing material in the channel may render the top gas-tight. The top is provided with a suitable charging device, such as the hopper, 3, which is provided with the ordinary bell, controlled by a lever or otherwise. A pair of rails extend along the tops of these producers, forming a track for the wheels of the car carrying the mechanism. On the car is the hopper, 4, having an inclined bottom, and the delivery spout, the latter terminating at a suitable point to deliver fuel into the hopper, 3, when the gate at the lower end of the spout has been swung up from beneath the same by means of the handle or other mechanism. The spout is so situated as to deliver the contents of the hopper, 4, into the hopper, 3, of any of the producers provided the car be moved into proper position, which is accomplished by means of an electric motor, 5. This motor through suitable spur and bevel gears drives the wheels of the car. The car supports the circular track, 6, on which the wheels, 7, of the trolley, 8, travel.

A motor, 9, carried by the car, 12, drives through gearing drives the splined shaft on which the spur gear 10 may slide, but which compels the gear 10 to rotate with it. This gear 10 normally meshes with the circular rack 11 on the top plate 2, but by means of the fork-lever 12 and the system of levers and the handle attached to it, may be slid on its shaft so as to be out of mesh with the rack. The gear wheel 10 also meshes with the spur gear 13 which has such a length as to be in mesh with the wheel 10, irrespective of the position of the latter. The gear 13 meshes with the circular rack 14 on the trolley 8. The trolley supports a radially movable bed plate 15, provided with a pendent lug in which the radially placed screw 16 works, the ends of the screw being journaled in the appropriate bearings. The screw is rotated by the motor 17 through gearing. The bed plate 15 supports a fixed roller 18, which is parallel to a roller 19 which is carried by the carriage 20, and movable within small limits on the bed plate. The roller 19 is held as close as possible to the fixed roller 18 by a set of springs bearing on lugs. The rollers are grooved so as to form a circular passage between them for the reception of the poker 21. The poker is a long cylindrical hollow bar, which may reach

down below the rollers 18 and 19 and through the poke-hole 22 in the top plate. The poker is caused to rise and fall by means of the motor 23 and the intermediate gearing which connects the motor shaft to the shaft of the roller 18.

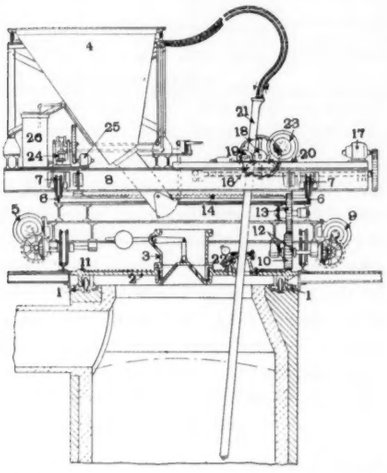


FIG. 3—SECTIONAL ELEVATION OF SMYTHE AND SHINN GAS PRODUCER CHARGING MACHINE. SECTION PLANE 90 DEGREES FROM FIG. 2.

The roller shafts are geared together to give the rollers equal speed. The poker has two flexible tubes connected to its upper end, one being connected to a tube extending toward the lower end of the hollow in the poker. The other tube is connected through a pipe to the lower portion of the pump cylinder 24, whose piston is driven by the motor 25. The first tube is connected by a pipe to the top of the water tank 26 which with the motor 25 and the pump lies beneath the bottom of the hopper 4. The bottom of the tank is connected to the lower end of the pump cylinder 24. The operator's cage in which are the necessary controllers is shown at 27. The poke hole may be variously constructed, but preferably with a valve which is removed from the hole by the poker, and will return to close the hole when the poker has been withdrawn.

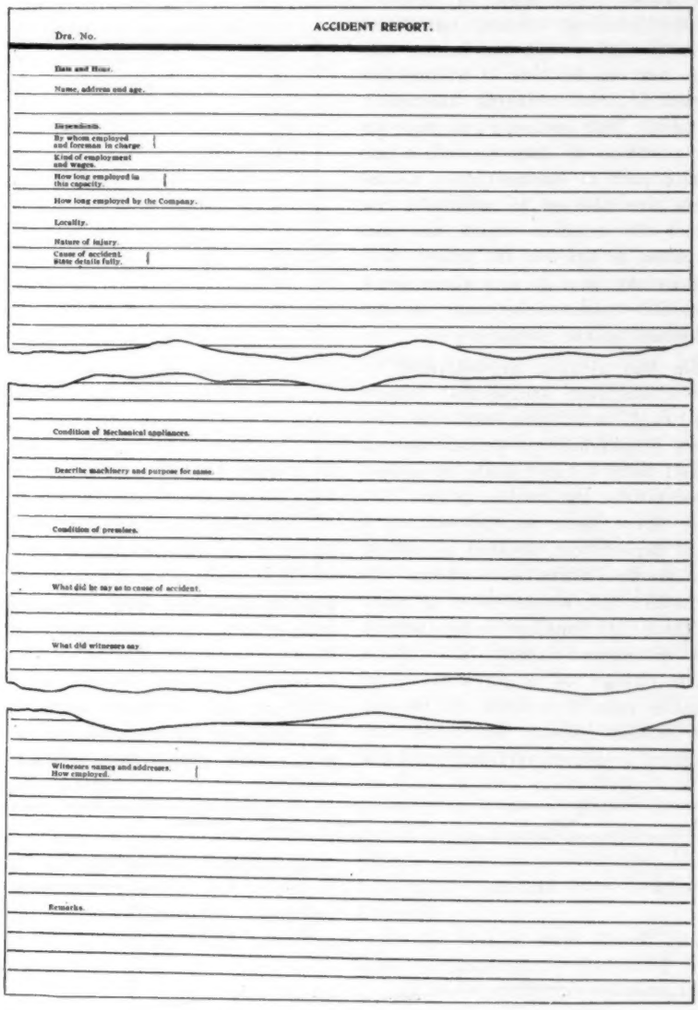
In order to agitate or poke a charge in the gas producer, the car with the poker elevated above the top plates of the producers, is moved until the axes of rotation of the top plate 2 and the trolley 8 are in alignment. If the poker when vertical, is not in the same vertical plane with the poke hole which is radial, the gear wheel 10 is disengaged from the rack 11 by means of the system of levers 12 and 5, the motor 9 is actuated so as to rotate the trolley 8 and so move the poker into the required position above the poke hole. The gear 10 and the rack 11 are then re-engaged, and the motor 23 operated to drive the poker down through the poke hole and into the fuel in the producer. The pump motor 25 is started to maintain a circulation of water in the poker, and the motor 17 is caused to rotate alternately in opposite directions to give the poker radial movement in the producer; the motor 9 is started to give the top plate 2 and the trolley 8 rotary movement, their movement being in the same direction and at the same speed, whereby the poker travels with the top plate in a circle. When the charge has been sufficiently poked, the several motors are stopped and the poker is lifted from the poke hole, the car is moved so as to bring the trolley over the top plate of another producer, when the operation just described is repeated. The hopper 13 may be filled and discharged into any of the hoppers 3 of any of the producers, as necessity requires. By the means above outlined it is possible to poke the entire charge from center to circumference and to any desired depth, the poker having a zig-zag movement in the charge as it travels in a circle with the poke hole. It will be noticed that the poke hole serves as a fulcrum for the poker.

MODERN OFFICE PRACTICE---VII

Accident Reports

By Ridgley Newcomb

Any manufacturing concern employing 100 or more men, whose duties bring them into contact with machinery, is apt to have more or less accidents. If there were any way to prevent such happenings, there is not a company or corporation in the country but would do anything, at any


ACCIDENT REPORT.

Drs. No.

Date and Hour.

Name, address and age.

Dependents.

By whom employed and foreman in charge.

Kind of employment and wages.

How long employed in this capacity.

How long employed by the Company.

Locality.

Nature of injury.

Cause of accident. State details fully.

Condition of Mechanical appliances.

Describe machinery and purpose for same.

Condition of premises.

What did he say as to cause of accident.

What did witnesses say.

Witnesses names and addresses. How employed.

Remarks.

FIG. 1—ACCIDENT REPORT.

OFFICE NO	HOSPITAL NO	NAME	AGE	OCCUPATION	DISEASES OR INJURY	REMARKS
						ASSISTANT SURGEON.

FIG. 2—PHYSICIAN'S REPORT.

cost, to avoid them. But, as they are inevitable, and the larger the plant and the greater the number of men employed, the more accidents there will be, the question has to be met and dealt with.

Obviously, it is necessary to know all the details of any accident, how, when and where it happened, the extent of the injury; the condition of the mechanical appliances; premises, etc. This information not only has to be obtained as soon as possible after the accident occurs, but must be a matter of record for future use.

How best to do this is a question with which large concerns are much interested. No company desires to invite attention to this, the most unfortunate part of its operation, therefore we are obliged to withhold the name of the concern which has had this system in use for six years. Suffice it to say that it is a thoroughly responsible corporation, one of the best known in the country.

While this system, as described, is in use where there are several departments, each in a way separate and distinct, employing altogether several thousand men, it can readily be adopted successfully by smaller plants.

First, there must be, of course, a surgical department, located as nearly central to the works as possible. In cases where the works cover a large area, there are one or more branch offices distributed about the plant, each in charge of a physician. As soon as a man is injured, he is sent to the nearest doctor's office. If seriously hurt, a doctor is telephoned for to come to the department as quickly as possible. First aid appliances, stretchers, bandages, etc., are kept at hand in each department.

FIG. 3—ENVELOPE FOR FILING RECORDS OF A GIVEN CASE.

If the case is likely to be serious, the head of the department in which it occurred, immediately summons the witnesses and has their statements of how the accident happened taken down by a stenographer, after which the statements having been transcribed and read to them, are signed by them in the presence of witnesses. A written report (Fig. 1) with the testimony, if any, attached, after being approved by the head of the department, is forwarded to the one having the accident and relief department in charge.

Each morning the chief surgeon sends in reports over his signature of all cases treated by the department on the preceding day. Anything treated by the surgical department is termed an accident. This report is also marked to show the classification of the man injured according to the following symbols:

Colored	"C"
White	"W"
Foreign	"F"

By "Foreign" is meant any who can not speak nor understand the English language. The nature of the accident itself is divided into four classes, as follows:

Minor	1
Severe	2
Partially disabled	3
Fatal	4

From the foregoing it will appear that a doctor's report marked "C-2" would indicate a colored man severely injured; "W-4" would be a white man fatally injured, etc. This is used in making the monthly summaries as to the total number of each class of accidents to the different races of men employed, and will be explained in detail later.

Fortunately, even in the largest plants, the greater part of the acci-

NO.	NAME.	DATE.	DEPT.	CLASSIFICATION	REMARKS.

FIG. 4—CARD FOR INDEXING ACCIDENTS ALPHABETICALLY BY NAME OF MAN.

.....DEPARTMENT. CARD NO.....

NO.	NATURE OF INJURY.	NAME.	CLASSIFICATION	REMARKS.

FIG. 5—CARD FOR INDEXING ACCIDENTS BY DEPARTMENTS.

FATAL ACCIDENTS 190

NO.	NAME.	WHEN INJURED.	WHERE.	REMARKS.

FIG. 6—CARD FOR INDEXING FATAL ACCIDENTS.

HOSPITAL CARD.

NO.	NAME.	DATE.	DEPT.	ENTERED.	LEFT.

FIG. 7—CARD FOR INDEXING HOSPITAL CASES.

dents, probably 95 per cent, are minor, running from bruises, slight contusions, lacerated fingers and the like. In cases of this kind, it is not necessary to take testimony or make immediate reports. This is only necessary when a limb is broken, or the accident is fatal. When a man is injured to the extent that he is sent direct to a hospital, it is well to send a special messenger to the man's residence, advising his family of the injury and of the hospital to which he has gone. This forethought often puts the company and the family on a better footing.

These doctor's reports also state on their face, whether or not the injured party was sent to the hospital. This, together with all the other markings are made use of in the indexing.

As soon as the reports are received from the chief surgeon, a letter is sent to the heads of the departments, advising them as follows:

Date.....

Mr. P. H. Carroll,
Supt. Construction:

Kindly send us as soon as possible, reports on the following accidents, giving doctor's number at same time:

Date of Accident.	Doctor's No.	Name.	Nature of Injury.
Jan. 9th,	123	Henry Jones,	Lacerated arm
Jan. 9th,	126	Mike Marshall	Cut leg

Yours truly,
Supt. Relief Department.

It will be noted that the letter asks that the doctor's number be given. The reports from the doctor are numbered consecutively. This is done so that it may be known at any time just how many patients have been treated, and it also assists in filing, as many of the men are foreigners and it sometimes happens that the names will be badly mixed. If the numbers correspond, it is reasonably sure to be the same man.

Now as to the filing of these reports. The person in charge of the department follows up his letters to the department heads to make sure that all accidents are reported on, the printed form shown in Fig. 1 being used for that purpose. The doctor's report on the same case is attached to the report from the works, and the two with any attached papers bearing on the accident are put in a heavy manila envelope, being numbered in red across one end, beneath which number the man's name, date of injury, nature of injury and department in which he was injured are written. Beneath this the symbols showing whether he is white, colored or foreign and whether his accident is minor, severe, partially disabling or fatal, is also noted. The envelope is shown in Fig. 3.

A card index is now resorted to for the indexing. A card, Fig. 4, is made, showing the number of the envelope, the name, date of injury, department, the classification of the man and injury by the symbols and remarks. As these cards are separated in the drawer by tab cards with 150 alphabetical sub-divisions, it is possible to use the same card for names which are similar. Behind the tab reading "Coo-Cor" may be filed on the same cards, Cornish, or any other name beginning with "Cor." This prevents the files from filling up too readily as each card will hold 18 names. As the tab cards afford ample protection, this causes no confusion. In cases where the name is common, like Jones, Brown, Smith, etc., no other names but those are put on the same card.

So much for the man. If the man's name is known it is easy to find his card. But suppose it is only known that a man received a certain injury, say a broken leg, in a certain department on a given date. Or suppose it is desired to know how many accidents occur in each department per month. It could not be told from the men's cards, so the accidents are cross indexed by departments. Fig. 5 shows how this is done. The envelope number, nature of injury, the man, his classification and remarks are all provided for. If it is necessary to know anything at all about the case, it is now possible to get the report promptly. As one card becomes filled, another is used, giving it the next highest number. In five years, the drawer has not yet become too full, and when it does, the older cards may be laid aside.

Fatal accidents and hospital cases are all treated in the same way, but in addition have special cards as shown by Figs. 6 and 7, so that it is possible to tell at a glance just how many fatal accidents have occurred within a given period, and likewise how many patients have been in the hospital.

At the end of each month, a summary is made up as shown by Fig. 8, giving the distribution of men injured in each department. The department

.....DEPARTMENT SUMMARY FOR MONTH OF.....190

	WHITE	FOREIGN	COLORED	TOTAL
Fatal Accidents				
Partially Disabled				
Severe				
Minor				
Total,				

.....190

	WHITE	FOREIGN	COLORED	
Fatal Accidents				
Partially Disabled				
Severe				
Minor				
Total				

FIG. 8—SUMMARY OF ACCIDENT CASES, 4 x 4 INCHES.

cards, as well as the special cards, are all filed in the same case with the other index cards, but separated by means of suitably inscribed tab cards. Each of these summary cards provides for two months, and evidently these will not accumulate very rapidly.

On the envelope in which the data regarding the case are filed, is written such items of expenditure, whether for board, medicine, release, etc., so to know what any accident has cost, or in fact to know anything at all regarding the case, it is only necessary to turn to the card index to obtain the number of the envelope, and the whole story is available.

These reports should be filed twice a week. An ordinary clerk can do it on the typewriter, writing envelopes and cards, for all the accidents of a plant employing 5,000 or 6,000 men, in three hours, twice a week.

If any of the officials of the company ever want to know, and know promptly, how many colored men were killed during any period, how many white men were severely injured, or how many foreigners were treated, or how many men have been killed within a stated time, the special cards give all the information.

A NEW TOLEDO PRESS.

We illustrate herewith a large and powerful geared press with special dies and tools fitted and designed by the Toledo Machine & Tool Co., Toledo, O., for making seamless pressed steel covers or tops and other parts for burial vaults and similar work. The illustration shows a burial vault cover or top at the left just as the stamping is produced by the press and dies.

The operation consists in first placing the plain flat sheet in position on the dies. The press is then started by means of the hand lever shown at the right of the press which operates the friction clutch and starts the press, which then completes the drawing, forming and finishing of the shapes for these burial vault tops or covers. The work as described is completed at one stroke of the press and requires but 10 seconds for the entire operation of placing the sheet in the dies, finishing and removing the completed cover.

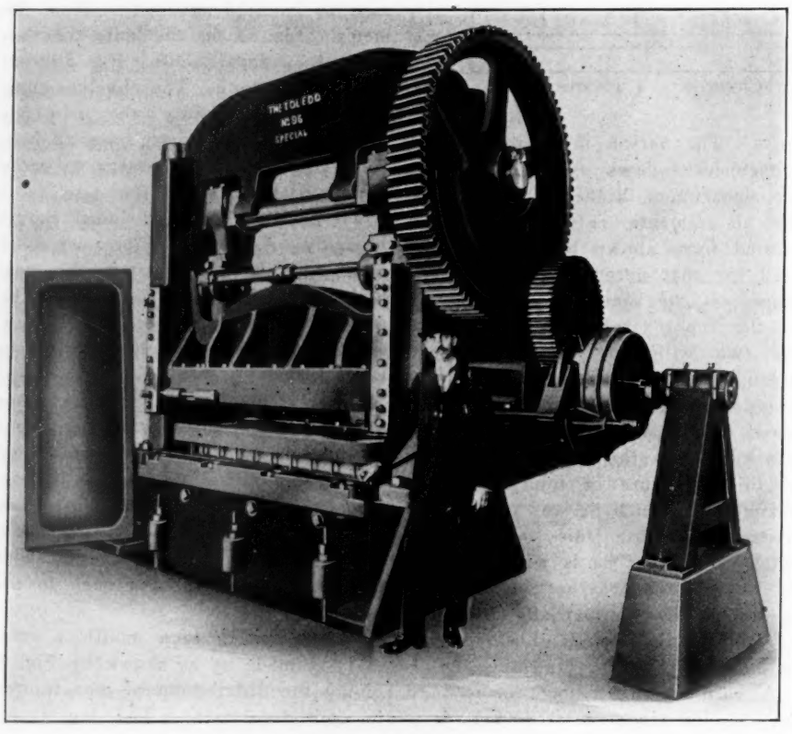
A feature embodied in the construction of these dies is that they are made adjustable for two, three or more lengths of covers or tops, without removing either the upper or lower dies from the machine. This is of considerable convenience in the adjustment of the tools on account of their great size and weight. The dies produce a cover practically free from wrinkles or buckles.

The dies are termed combination, double acting, drawing and forming dies and make possible the production of deep stamped steel shapes in a single acting geared press. The drawing or pressure ring shown in the illustration rests on the studs or pins around the interior of the lower die, on which the flat sheet is placed. The sheet is controlled while being formed by means of the heavy spring pressure attachment which is placed in the interior of the press bed. A suitable tension is obtained with this attachment on the drawing or pressure ring by means of six heavy studs and springs, three in the front and three in the rear of the machine. Three of these are shown in the illustration and are so arranged that it is unnecessary for the operator to go into the pit under the press bed, adjustment being made entirely by means of the projecting studs and nuts on the lugs as shown.

It is necessary to provide a suitable foundation for the machine and a pit under the press for the attachments and bed project which is below the floor line. One operator and a helper are required to handle the work and operate the machine. The friction clutch with which this machine is fitted enables the operator to raise or lower the slide or ram and to stop the machine as desired at any part of the stroke or slide motion.

The gearing in this press is all machine cut from the solid and the workmanship, construction and material throughout are of the usual high standard. Some of the principal dimensions of the machine are:

Total weight	85,000 pounds
Width between uprights	102 inches
Front to back	50 inches
Stroke of slide motion	12 inches
Bed to slide, stroke and adjustment up	27 inches
Ratio of gearing	26:1
Diameter large gear	74 inches
Size of balance wheel	60 x 8 inches
Floor space	92 x 220 inches



HEAVY "TOLEDO" DRAWING PRESS.

A NEW HAND THREADING MACHINE.

The accompanying illustrations show the features of a new hand pipe threading machine, which has recently been placed on the market by the Threading Machine Co., Sandusky, O. The features which render this machine especially valuable are the positive lead screw for the chasers, the conical ring, which automatically causes the pipe thread to be given the proper taper, in accordance with the standard Briggs thread, and an automatic throwout for the chasers, which removes them from contact with the pipe when the thread has been cut the proper distance.

The thread on the pipe is cut by means of the four chasers carried in the head, as shown. The head is provided with an extension with a lead screw, which engages with a corresponding screw on the case, as shown. This causes the thread on the pipe to

be cut the proper pitch and the chasers are not depended on to give this pitch. The chasers at their outer ends bear against a taper ring, as shown, which is given the proper taper for the pipe being cut, in accordance with the Briggs standard. As the chasers move on the pipe, they are automatically forced against this ring, thus receding from the center of the pipe as the thread progresses. When the proper depth of thread has been cut, the notches at the rear end of the chasers engage with a ring at the bottom of the case, which automatically withdraws them from engagement with the pipe. By means of this device, it is impossible to cut a thread further on a pipe than is required by the standard. It also permits the machine to be withdrawn from the pipe without unscrewing and without injury to the thread or dies.

The conical ring is held in place by a retaining ring, which also acts as a guide for the head, relieving the lead screw from all side strains and prolonging its life. The dies are inserted from the outside, each being provided with a stop to prevent it projecting too far over the pipe. The machine is made in three sizes, the smallest having a capacity for pipe from 1 to 2 inches, while the second one cuts thread on pipe from 2½ to 4 inches. The largest machine has a capacity for pipe from 4½ to 8 inches.

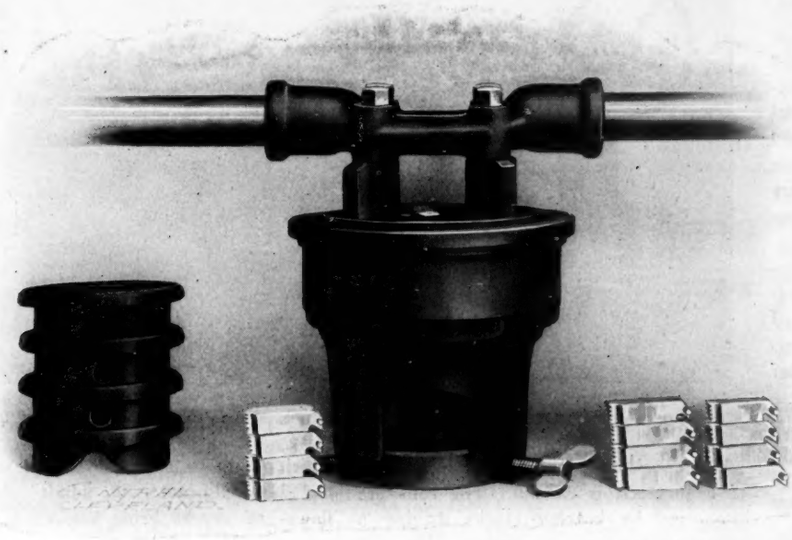


FIG. 1—THE "SANDUSKY" THREADING MACHINE.

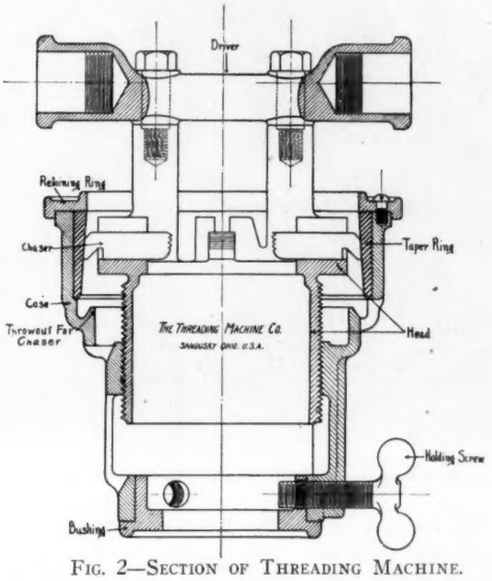


FIG. 2—SECTION OF THREADING MACHINE.

The larger machines are provided with a gear and pinion drive, as shown in two of the accompanying illustrations. A ratchet handle is furnished for operating these larger sizes. The two larger sizes are also provided with a base for the bench, or with a base and tripod supports for portable work.

FIG. 3—THREADING MACHINE MOUNTED ON TRIPOD.

The offices of the Sewanee Fuel & Iron Co., are being removed to Chattanooga, and will occupy rooms on the ninth floor of the James building. F. B. Martin will remain president of the company, John E. Porter, general manager, and Carl Martin, secretary. The new company will be the successor of the old Sewanee Coal & Iron Co., which had formerly been located at Tullahoma, Tenn.

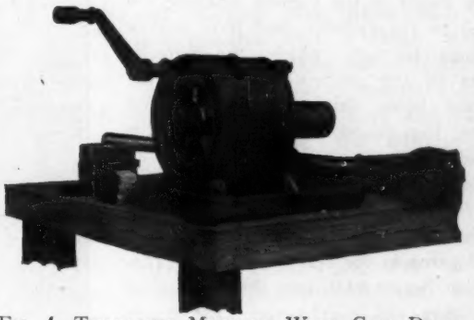


FIG. 4—THREADING MACHINE WITH GEAR DRIVE.

The United States Steel Corporation has awarded the contract for the construction of 95 dwelling houses to be erected on the Gogebic range, the houses to be ready for occupancy in the spring.

SOME NEW BRIGHTMAN SHAFTING MACHINERY.

The well known machinery of the Brightman Mfg. Co., Shelby, O., is used for finishing shafting, bronze rods, tubing, etc., by the "Turned Process" in all sizes from 1 to 6 inches, inclusive, and is installed in a large number of plants throughout the United States and Europe. This company has recently designed and brought out additional shafting machinery to meet the demand of users who wish to install at their individual plants this class of machinery for their own exclusive use. This machinery is illustrated herewith.

Fig. 1 shows the new turning machine. The rough bar, tube or rod is fed in at one end by a set of feed rolls which are driven by worm wheels and worms attached to perpendicular and horizontal shafts, having a four-step cone to regulate the feed. The material is centered by a guide placed in front of the rolls. It has a perpendicular adjustment, and the feed rolls make the other adjustment, which is horizontal.

The material after leaving the feed rolls enters a hollow cylinder through a bushing to the guide head. This guide head contains guides set in segmental slots, which have a screw adjustment. The material then passes to a cutter head which contains a steel cutter and guides set in segmental slots, the cutter and guides having a screw adjustment. This cutter or finishing head turns the stock to size, and it is then ready for the straightening or finishing machine, shown in Fig. 2. The finishing heads in the turning machine are bolted to the cylinder, and have hollow bearings, through which the material passes in the process of turning, the cylinder being driven by a gear and pinion, the pinion being attached to a horizontal shaft.

The bed of the machine is a receptacle for a solution of soap, which is continually pumped on the cutters by a small pump in the rear of machine. This solution drains back into the bed and is used over and over again. The boxes that surround the cutter heads are used for holding chips or turnings. They are arranged with side openings, so that they can be readily cleaned while machine is in operation. At each end of the machine tracks are provided, traversed by a gripping device which will hold the stock from revolving with the machine. Material as short as 8 feet can be turned, and as much longer as may be necessary.

Fig. 2 shows the machine designed for the purpose of straightening rounds in the solid, both rough and finished, steel pipe, bronze rods, tubes, etc. The straightener consists of a bed with upright pedestal bearings, which support a revolving frame with hollow journals, and on which the straightening mechanism, which consists of three rolls having concave surfaces, is carried. The rolls are supported by bearing blocks, having a swivel and screw adjustment. The roll supports are secured to the revolving frame so as to project alternately from opposite sides.

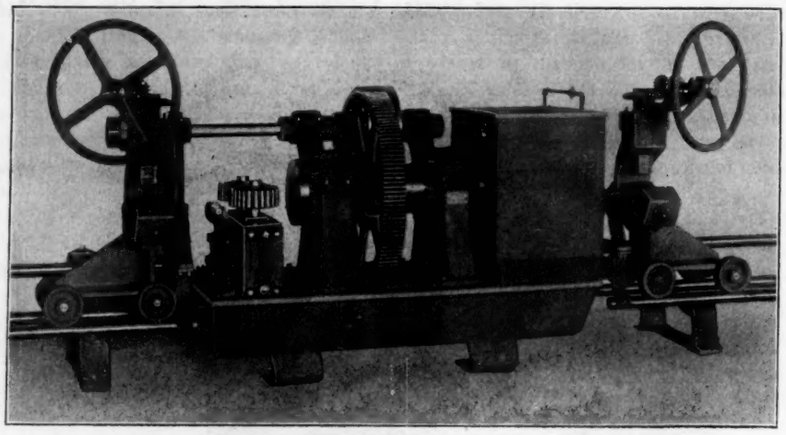


FIG. 1—BRIGHTMAN SHAFT TURNING MACHINE.

At each end of the straightener, tracks are provided, traversed by a gripping device which prevents the material to be straightened from revolving, The contact of the concave rolls, in the revolving frame, will produce varying speeds according to the amount of concave surface put on the rolls. Also a certain amount of slipping by the rolls will put on a very fine finish, as well as to straighten the shaft.

The rolls are adjusted at an angle to the shaft according to the diameter of the latter, and each roll will have a segmental line of contact with the shaft. This will prevent all gouging out, or breaking of the edges of flaws or cracks which might be found in the surface of the material, and will admit of such flaws and cracks being smoothed over.

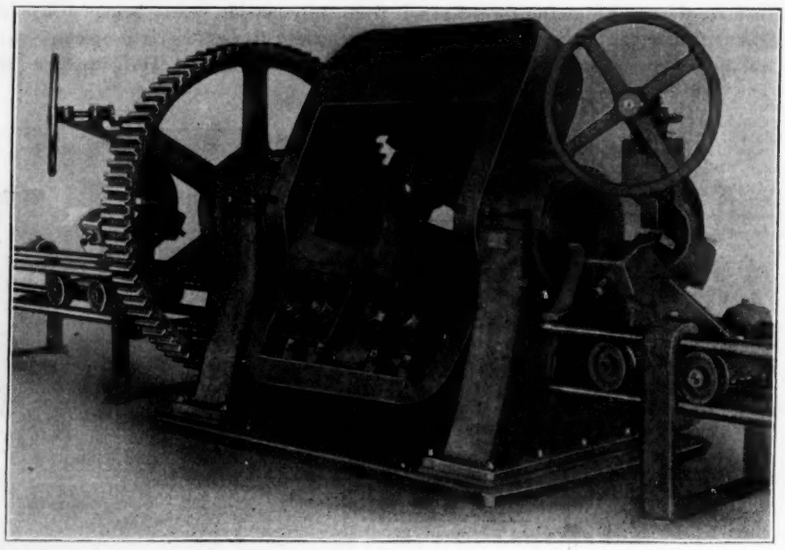


FIG. 2—BRIGHTMAN SHAFT STRAIGHTENING MACHINE.

Oscar Stromborg, metallurgical engineer, formerly with the Youngstown Sheet & Tube Co., and E. F. Mass, mechanical engineer, have formed an engineering company known as the Western Engineers with offices at 308 Arcade building, Seattle, Wash. The new company will make a specialty of iron, steel and foundry engineering and has been appointed Pacific coast representative of the following eastern manufacturers: Mesta Machine Co., C. O. Bartlett & Snow Co., Youngstown Car Mfg. Co. and Scott Mfg. Co. of St. Louis.

MADE AT LOSS.

Discouraging Experience in Iron Business in Australia.

(Special Correspondence.)

Sydney, N. S. W., Sept. 28.—The fate of the iron industry in Australia is once more in the balance. A wages dispute led to the appointment of the Lithgow Iron Trades Wages Board. Investigations into the financial position of the G. & C. Hoskins have proved that during the last six months pig iron production has been an unprofitable business for them, the net loss on the trading operations for the period being £8,207, about $40,000. The professional accountant called in to adjudicate on the claims, gives it as his opinion that the position of the industry is such as to call for a decrease in wages. The wages board may, or may not, endorse that opinion; owing to an agreement made with the Sandford Co. (the predecessors of the present owners of Lithgow Iron Works), the iron trades unions have a very strong claim against a reduction. Fortunately, the continuance of the industry is assured by government contracts for iron and steel supplies at advanced rates. The commonwealth with its defense program is also interested in the establishment of the industry. In the present session of parliament, an iron bonus bill is expected to pass. This should help to put the industry on a paying basis, but apart from anything in the way of outside assistance, it is evident that the manufacture of pig iron cannot hope to be financially successful unless the output of the furnaces is increased. The capacity of the plant at Lithgow exceeds 1,000 tons per week, and if the average production for the six months under review is only 500 tons, the costs on the latter tonnage must inevitably work out at a higher ratio. Up to the time of writing, neither the wages question nor the bonus has been settled, but in the interests of the whole community it is very probable something of an encouraging nature will be done to support the industry.

Large Contract Approved.—The war department has taken final action approving the contract recently awarded to the Lidgerwood Mfg. Co., New York City, for furnishing some $30,000 worth of cableways to the Isthmian Canal Commission. This action is a complete exoneration of Lieut.-Col. Goethals, chief engineer of the commission, and disposes of the charges of discrimination brought by the Balanced Cable Crane Co. and the New York Cableway & Engineering Co., both of New York City, and the S. Flory Mfg. Co., Bangor, Pa. The last named company had made no charge of collusion or corrupt practices, merely declaring that the engineering features of its cableway had not been properly appreciated by the investigating committee. This contract is said to be the largest of its kind ever awarded.

ENGLISH FACTORIES

May Be Acquired for Manufacturing Under New Patent Act.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Oct. 17.

One of the biggest bridges built in Great Britain has just been completed by Sir William Arrol & Co., of Glasgow. They have successfully crossed the River Wear with a double decker span, of which the upper carries the North Eastern railway, and the lower a public roadway. With its approaches, it is one and three-quarter miles long, and cost $500,000, and, with some modifications, was carried out on the cantilever principle employed in the Forth bridge. The work has been finished without any interference with the river traffic.

The new patents act has had a very important effect upon British trade. Under this law, foreign investors possessing British patent rights have to manufacture their goods wholly or partly in Great Britain. It is authoritatively stated that a syndicate comprising German, American, Russian and French capitalists is being formed to acquire English factories for the making of British patented articles at cost price, the syndicate charging a small commission on the sales. This is the alternative to the expensive building or hiring of factories in England equipped with plant and large staffs of workmen. It is intended to begin next year with 20 factories acquired in this way.

Pearson & Knowles, in spite of bad trade, have been able to declare a dividend of 11¼ per cent, with 6 per cent on preference shares.

Sir Christopher Furness' scheme of co-partnership is still being keenly discussed. He has had hundreds of letters from working men as well as from cabinet and ex-cabinet ministers. Sir Christopher in an interview has stated that the workmen, if left to themselves or allowed to take action through the local union lodges, would undoubtedly accept the scheme. In regard to his own workmen, he anticipates they will accept it, and he leaves them at liberty to abandon it at the end of 12 months if they are then dissatisfied with its working.

CO-PARTNERSHIP PLAN APPROVAL BY THE WORKMAN.

In spite of the attacks made upon Sir Christopher Furness' scheme and the unsparing criticism of trade union leaders, the eminent northern ship builder has scored his first success. At West Hartlepool, on Friday, Oct. 23, a conference of delegates numbering 70, representing various trade unions connected with ship building on the North East coast, considered the new scheme for nearly four hours. A deputation which had waited upon Sir Christopher with regard to certain details, reported, and a resolution was carried approving of the scheme of co-partnership and recommending its acceptance by the local branches of the various unions concerned, with an experimental period of 12 months, subject to the endorsement of the executive committees of the various unions. The report of the deputation was considered very satisfactory. The workmen will have to take up shares to the value of £10 paid for a reduction of 5 per cent in wages. The reply of the unions is due by Nov. 25. The yards are now closed, but there is prospect of their opening if the men support their delegates. It is just possible that a check may be sustained when the matter comes before the executive committees of the unions. But if the rank and file are fairly unanimous, the official heads may deem it wise not to risk a split.

Outlook for Business.—In regard to current railway equipment business, President Hoffstot of the Pressed Steel Car Co. is quoted as follows: "The business of the Pressed Steel Car Co. is running extremely light with little prospects for immediate improvement. The railroads have come into the market for their new pressing necessities, but that is about all. The improved monthly showing will extend over the crop moving period. In the past, nearly all substantial business revivals have started in the spring of the year and gained momentum sufficient to carry them through the summer. That will be the story of the next upward turn."

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Central Ohio Iron Metal Co., Columbus, O., has been incorporated by A. Goldberg, B. Goldberg, Sam Harwitz, J. Dubinsky and D. Seigel with $5,000 capital stock.

The Ohio Corrugated Culvert Co., Middletown, O., with a capital stock of $65,000 has been incorporated by C. R. Hork, R. C. Phillips, T. C. Sutphen, F. H. Simpson and H. Ling.

The Kelley Electric Machine Co., Buffalo, has been incorporated with $25,000 capital stock for the manufacture of tools and machinery by Guilford W. Francis, W. Morse Wilson and George L. Kelley, all of Buffalo.

The Wilmot Engineering Co., Tamaqua, Pa., has been granted a charter to engage in the construction and manufacture of machinery, buildings, etc., with a capital stock of $50,000 through G. W. Wilmot, Tamaqua; John Weber, Hazle Brook, Pa.; A. C. Leisenring, Upper Lehigh; Ray E. Meyer and Jeremiah Woodring, Hazleton, Pa.

The East Waterford Machine & Supply Co., East Waterford, Juniata county, Pa., with $8,000 capital stock, has been chartered through W. A. Pannabaker, J. B. McMeen, East Waterford; and J. Howard Neely, Mifflin, Pa.

A charter will be asked at Harrisburg, Pa., Nov. 16, for the General Machine Works, York, Pa., by A. R. Frantz, Geoffrey Yost, Horace Brillinger and E. E. Small.

The Phoenix Gas Engine Co., St. Louis, has been chartered by R. S. Kingsland, George E. Kingsland, George T. Dougherty, Charles E. Clore and M. G. Gill with $5,000 capital stock, fully paid, to manufacture and deal in engines.

The Journal Lubricator Co., New York City, to deal in heavy foundry and machine shop supplies with $50,000 capital, has these incorporators: Jas. A. Mooney, 100 Fenimore street, Brooklyn; Edward C. Moen, 52 William street, New York; W. Arthur Newman, 974 Bedford avenue, Brooklyn.

The American Eagle Motor Co., New York, to manufacture engines, machinery, etc., with $5,000 capital, has been incorporated by J. Atlee Tallman, 43 Exchange place, New York; Frank Mueller and Joseph L. Matthews, 126 Patchen avenue, Brooklyn.

A. B. C. Equipment Co., New York, to deal in new and second hand machinery, builders' supplies, etc., with $5,000 capital, has these incorporators: William C. Herlihy, 325 East Thirty-first street; Frank F. Gallagher, 141 East Thirty-eighth street; Peter G. Gallagher, 155 East Forty-fifth street, all of New York.

The Eastern Metal & Refining Co., Boston, to deal in metal of all kinds, with $15,000 capital, has these incorporators; President, Edwin E. Farnham, Belmont; vice president, William G. Roberts, Melrose; treasurer, Austin T. White, Cambridge; Secretary, Wiley S. Young, Winthrop; clerk, Wiley S. Young; attorney, Woodward Emery, 28 State street, Boston.

The Etna Forge & Bolt Co., with $50,000 capital stock, has these officers: Treasurer, John Metzger, Etna, Pa.; directors, Frederick G. Metzger, Aspinwall, Pa.; John Metzger Jr., Conrad C. Metzger, George J. Metzger, and Martin Metzger, all of Etna, Pa.

The Astoria Metal Working Co., New York, to manufacture machinery, engines, etc., with $25,000 capital stock, has been incorporated by Augustus S. Houghton, Woolsey A. Shepard and Charles B. Young, 111 Broadway, New York City.

The Randall Electric Welding Co., New York, has been incorporated by Harry C. Randall and Guy Osborn, 70 Duane street, New York City, and J. William Corrigan, Mt. Vernon, N. Y., with $20,000 capital stock for the electric welding of metals.

R. & M. Talsky Co., New York, has been incorporated with $12,000 capital stock to manufacture steel and iron work, through Rudolph S. Talsky, 1612 Pitkin avenue, Brooklyn; Morris Talsy, 714 East Sixth street, and Barnet Sponchik, 438 East Tenth street, both of New York City.

The Kwality Tool Co., New Haven, Conn., has been incorporated by George P. Butler, Nettie B. Butler and Daisy N. Church, all of New Haven, with an authorized capital of $5,000 of which the business will be commenced with $2,500.

The Derby Mfg. Co., Duluth, Minn., has filed articles of incorporation to manufacture steel and iron appliances with $50,000 capital through Henry J. Derby and Louis T. Derby, of Montpelier, N. D.; Prosper Derby, Joseph Ryan, and A. T. Park, of Duluth.

The International Railroad Supply Co., St. Louis, Mo., has been chartered with a capital stock, fully paid, of $100,000 to deal in steam and electric railroad supplies and all mechanical devices. The stockholders are Garrett Brown, P. P. Shaw, J. L. Babler, J. M. Butcher, Bailey Wilkinson, Charles L. Shaw, all of St. Louis, and C. A. Glueck, Belleville, Ill.

New Construction:—

The Howard Stove Mfg. Co., Omaha, Neb., has let the contract for a one-story factory building, to cost $25,000.

The St. Lawrence Engine Co., Brockville, Ont., is preparing plans for building a factory for the manufacture of motor engines.

The foundry of the Union Machine & Foundry Co., which was recently destroyed by fire at Nashville, Tenn., will be rebuilt according to present plans.

The Joliet Wheel Mfg. Co., Joliet, Ill., has begun excavating for its new plant. The main building is to be 70 x 270 feet, of brick, part one story and part two stories. For the present, the office of the company will be at 204 Dearborn street, Chicago, and later offices will be opened at Joliet.

The American Car & Foundry Co. has secured a permit to erect at 2201-25 South First street, St. Louis, a new foundry to cost $90,000. The main structure will be 134 x 364 feet, one story; the core room, also one story, will be 36 x 95 feet, and the cupola houses will be three stories, 36 x 44 feet.

The St. Paul & Des Moines railroad has announced that it will abandon its shops at Iowa Falls, and begin at once the erection of a roundhouse and machine shop in Des Moines. The new building will be 100 x 200 feet, and will cost $20,000. The administrative offices of the company will be removed from Iowa Falls to Des Moines.

At a meeting of the stockholders of the Columbus Machine & Foundry Co., Columbus, Miss., Oct. 14, it was decided to rebuild the plant, which was badly damaged by fire Oct. 10. Bonds to the sum of $12,000 and bearing 8 per cent interest, running for seven years, will be issued, and will be subscribed for by stockholders. It is planned that the new plant will be larger and more modern than the one destroyed.

The Ontario Iron Works, Pulaski, N. Y., advises that it is building a two-story brick addition to its machine shop, 50 x 80 feet. This will make its machine shop a two-story building of brick, 50 x 150 feet, the upper story to be used for a pattern shop stock room and show

room. The blacksmith shop will be located in the lower part of the new addition. Part of the new equipment has already been obtained, and the company will not purchase the remainder until sometime toward spring.

The foundry building of the Peoria Foundry Co., Peoria, Ill., which was recently damaged by fire, will be replaced by a one-story structure, 100 x 212 feet.

An addition of 40 feet is being built to the Franklin foundry, Franklin, N. H., by Beaupre Bros., who recently leased the foundry, increased business compelling the building.

The Merritt Mfg. Co., advises that it is planning rebuilding the plant, of cement and brick, two stories, 50 x 70 feet. The company owns the water power of 100-horsepower over which it will build. The power and factory room will be rented.

Work on the car shops and warehouse for the Wisconsin & Michigan railroad has been started at Peshtigo, Wis., the shops to be 60 x 110 feet, equipped with modern car building machinery.

The Chesapeake Gas Engine Co., Newport News, Va., of which F. J. Robinson is general manager, has plans for a machine shop and shop yard, the shop to be 32 x 80 feet, of solid concrete walls and floor.

Crane Co. has had plans drawn for a five-story fireproof warehouse to be erected at Jackson street on the Santa Fe tracks, Dallas, Tex. Excavating for the foundation was completed several weeks ago.

The Colonial Coal & Coke Co., Dorchester, Va., advises that following the recent fire it has contracted for the erection of a store and office building, the store 70 x 90 feet, and the office 30 x 70 feet, two stories, to replace the burnt structure.

The Standard Boiler Plate & Iron Co., Niles, O., is shipping 14 Hyde water tube safety boilers of 125 horsepower, 14 stacks for boilers and 14 puddle furnace stacks to Girard, O., to be used in the new puddle and skelp mills, being built there by the A. M. Byers Co.

An addition to the factory of the Waterloo Gasoline Engine Co.'s plant, Waterloo, Ia., is being completed, which will add $14,000 square feet to the floor space of the works. The new addition is two stories, 70 x 100 feet, and will cost about $6,000. The company's business has grown so that only last year it was found necessary to erect the new foundry. The offices will be moved to the new addition. The officers are: A. A. Lupton, president; J. E. Johnson, vice president, and G. B. Miller, secretary-treasurer.

Construction work is being steadily done on the new buildings at the Columbus, O., plant of the Buckeye Steel Castings Co. It is planned that all of the new structures will be completed and ready for operating next spring.

The Oil City Boiler Works, Oil City, Pa., manufacturer of marine boilers, has let the contract for an addition to its plant, to cost $100,000. Construction work is to commence at once, with the expectation of being completed by April 1, when about 250 mechanics will be employed.

The new addition to the plant of the Connellsville Iron Works, Connellsville, Pa., is nearing completion, and the new machinery will probably be ready for operating within a few weeks. The new construction will double the capacity of the plant. It manufactures steel pit cars, larries, and other mine machinery.

Engineers are marking off the site at Coshocton, O., for the proposed new pipe foundry of James B. Clow & Son. The buildings will include a foundry, special foundry, machine shop, pipe mill, pattern storage, blacksmith shop, etc. Architects are now preparing specifications, and contracts will be let shortly.

S. Fair & Son, Saginaw, Mich., have plans for the erection of a large addition to their foundry, which will double its capacity. The entire front of the present building will be torn out and replaced by substantial brick building. Increased orders compeling the foundry to run 18 and 20 hours a day have caused the move.

The National Malleable Castings Co. has started plans for improving its plant at Sharon, Pa., which will be finished about the first of the year. Two steel buildings are included in the plans, one 72 x 250 feet, and the other 40 x 425 feet. The contract for building the additions has been given to the Riter-Conley Co., Pittsburg.

The Vulcan Iron Works has just completed the new machine shop for its West Pittston, Pa., plant, which will double its capacity. The new shop is 75 x 200 feet and 50 feet high, built of brick and concrete with an iron roof. New machinery and tools are being installed, and it will be placed in operation about the middle of December. Small engines and breaker machinery will be built in the new shop.

The Webster Full-Expansion Rotary Engine Co., of which George Lamont Webster is president, 520 Francis street, St. Joseph, Mo., which was recently incorporated with a capital stock of $100,000, has plans for a general machine shop, foundry and office building, as follows: The office building to cost $150,000, fireproof; factory, mill construction, 300 x 500 feet, to cost $50,000. Proposals for machinery will be opened about Dec. 15.

The contract for the construction of the William Fetzer Implement Mfg. Co.'s plant, Springfield, Ill., has been awarded to the Culver Construction Co., also of Springfield. The plant will cover over an acre of ground.

The Chicago Drop Forge & Foundry Co., 115th place, West Pullman, Ill., has purchased 30 acres east of South Park avenue, and will use it as sites for additional building construction in connection with its present plant.

General Industrial:—

The Octagon Drop Forge Co., Chicago, has increased its capital stock from $6,000 to $30,000.

The capital stock of the Vacuum Cotton Picking Machine Co., East St. Louis, has been increased from $350,000 to $3,000,000.

The McClintic Marshall Construction Co., Pittsburg, Pa., has increased its capital stock to $5,000,000, from $900,000.

A No. 30 Newten cupola has been installed in the Renssellaer Polytechnic Institute, Troy, N. Y., during the summer, making the foundry department of the institute complete.

The Platt Iron Works Co., Dayton, O., has been awarded the contract for the air compressor and fittings for the city water works pumping station, on its bid of $2,469,000.

The Des Moines Bridge & Iron Works is making its final shipment of construction material to Los Angeles, Cal., for the erection of the $1,000,000 federal building there.

The final subscription of $10,000 preferred stock for securing the Giese Mfg. Co. for Grand Island, Neb., has been secured and the foundry and wind mill manufacturing concern will be located there by the end of the year. The company will bring with it equipment and machinery valued at $15,000.

The Risdon Iron Works, San Francisco, Cal., has been awarded the contract for building two new fire boats for the city, at a contract price of

$262,200. The estimate for the boats had been $310,000.

The Omnigraph Co., Cleveland, has increased its capital to $300,000, from $1,000.

October orders of the Lukens Iron & Steel Co., it is announced, will show a substantial gain over September business, when the output was about 9,000 tons, of 50 per cent of normal. The company is employing now at the Coatesville, Pa., plant about 75 per cent of the full quota of workingmen.

The first castings poured in the foundry departmeent of the Wichita Falls Foundry & Machine Co., Wichita Falls, Tex., were made the second week in October for the Henrietta & Southwestern railway. The plant was located at Wichita Falls several months ago, and is meeting with an encouraging run of business.

The American Electrical Furnace Co., Niagara Falls, Canada, advises that it has established a demonstration plant, and has in operation electric induction furnaces, of the Colby-Kjellin type. These have been in satisfactory operation for some time. The larger one is producing crucible quality tool steel upon a commercial basis.

The Anchor Bolt & Nut Co., Poughkeepsie, N. Y., advises that it is the reincorporation of the Chapinville Wheel Co., whose charter had about expired. The Anchor company manufactures, and has been doing so for the past two years, a full line of common carriage and machine bolts, but its charter was issued only recently. It has at this time a factory nearly fully equipped, with the exception of bolt threaders, and is therefore somewhat interested in threading devices.

Trade Notes:—

The Dodge Coal Storage Co., principal offices of which are at Hunting Park avenue and the Reading railway, Philadelphia, has changed its corporate title to The J. M. Dodge Co. The change is made to more adequately cover the company's operations in wider fields of engineering and contracting.

Fires:—

The foundry and offices of the Pater Chalmers Co., Racine, Wis., were damaged Oct. 25 to the extent of about $2,500.

The Wabash Foundry, one of the chief shops of the Wabash railroad at Moberly, Md., was destroyed Oct. 21, the loss reaching $15,000. Valuable patterns, as well as castings and machinery were included in the loss.

The machine shop of S. H. Kauffman, Tipton, Ia., was badly damaged Oct. 14, the loss being estimated at $3,000.

The foundry of the I. & E. Greenwald Co., Cincinnati, was damaged about $500 worth, Oct. 15, by fire starting from an overheated stove.

The machine shop of C. P. Hutchinson, Salt Lake City, Utah, sustained damage of about $250 to machinery and $100 to building, Oct. 21.

The Joliet, Ill., Stove Works was saved from serious damage by strenuous exertion Oct. 24, the fire originating on the molding floor.

The foundry of H. H. Hammer, Red Bluff, Cal., was badly damaged Oct. 22, the loss entailed amounting to about $7,000, not including the loss of patterns.

The machine shop of the Buehler Machine Co., St. Mary's, O., was destroyed by fire Oct. 21, the loss on plant and machinery, engines, etc., reaching about $10,000.

The foundry of the Union Machine Co., West Nashville, Tenn., was damaged to the extent of $15,000 Oct. 21. Announcement was made that the foundry would be rebuilt at once.

The wooden elevator at the Bush Brass Foundry, Quincy, Ill., caught fire from cupola sparks, Oct. 20, but since the fire was confined to the elevator, the damage was nominal.

TRADE PUBLICATIONS.

ELECTRIC TRAVELING CRANES.—The Whiting Foundry Equipment Co., Harvey, Ill., is distributing a bulletin describing electric travelers and other cranes for railroad service in locomotive repair and boiler shops, machine shops, foundries, forge shops, axle shops, power houses, etc. It comprises eight 6 x 9-inch pages devoted mainly to illustrations of the various types of cranes installed, including traveling, gantry, jib and pillar cranes.

TIN PLATE.—The Follansbee Brothers Co., Pittsburg, is distributing a book entitled, "Tin Truth," describing the process of manufacturing tin plate as practiced in the Follansbee works at Follansbee, W. Va. It describes concisely the qualities of roofing tin plates, the development of the base plate, the action of chemical elements in raw material, the making of pig iron, processes for making steel and iron, comprising the knobbling process, the puddling process, the Bessemer process and the open-hearth process. The book then describes the operation of these various processes and the rolling of tin plate. The various brands manufactured by this company are also listed and described.

STEAM SEPARATORS. — The Pittsburg steam and oil separators are described in a 12-page pamphlet distributed by the Pittsburg Gage & Supply Co., Pittsburg. This separator was formerly known as the Detroit separator and its manufacture and sale has been taken over by the above company. The pamphlet describes its construction and operation and presents tables of sizes.

OIL ENGINES.—The Indiana Engine Co., Indianapolis, is distributing a 30-page catalog describing the Indiana kerosene engine. This engine is of simple construction, being without valve mechanism, and is built in three sizes of 3, 6 and 12 horsepower, respectively.

HEATING, VENTILATING AND DRYING MACHINERY.—Catalog 197, just issued by the Buffalo Forge Co., Buffalo, is an especially valuable book of 143 6 x 9-inch pages devoted to a discussion of the principles of heating and ventilating. It is divided into four parts entitled, respectively, "Heating and Ventilating of Public Buildings," "Heating and Ventilating of Industrial Buildings," "Buffalo Heating and Ventilating Apparatus," and "Data on Heating and Ventilating." The first section is devoted to a discussion of the principles of ventilation, and considers questions of room temperatures, heat losses, humidity, methods, and describes machinery devised by this company for carrying out these principles. Its application to schools, theaters, churches, hospitals, libraries and other public buildings is discussed. The second section discusses the same principles as the first section, applying them, however, to industrial buildings, and also takes up the fan system versus direct radiation, discusses the utilization of waste heat and of exhaust steam, and then presents illustrations and notes on the heating and ventilating of many different types of factory buildings. The third section gives a comprehensive description of the Buffalo Forge Co.'s machinery, including fans, blowers, engines, humidifiers, etc. Part IV, comprising over 50 pages, contains a particularly valuable number of data, which have been compiled and calculated by the company's engineers. These comprise, among other things, the relation of velocity to pressure of air and measurement of air flow, friction of air in pipes, carrying capacity of pipes, the determination of friction, heating effects of air at various temperatures, capacity of fans, and many other valuable tables and data.

REAMERS.—The Cleveland Twist Drill Co., Cleveland, is mailing a folder describing the Peerless high speed reamers, which are made in the following styles: Hand reamers, core reamers, chucking reamers, shell core reamers and shell chucking reamers.

GAS PRODUCERS.—The Gas Machinery Co., Cleveland, is sending out a bulletin of 16 6 x 9-inch pages describing the Wile gas producer for non-bituminous fuels. These producers are made in units from 35 to 300 horsepower, and are designed to operate on anthracite, coke or charcoal. The gas made from these producers contains about 130 B. T. U. per cubic foot. The bulletin describes the general construction of the producer and its auxiliaries.

SPIRAL RIVETED PRESSURE PIPES.—Catalog No. 5 has just been issued by the American Spiral Pipe Works, Chicago, and describes spiral riveted pipe, forged steel pipe connections, exhaust steam and hydraulic supplies. The catalog gives numerous illustrations of the application of American spiral riveted pipe, presents lists of users, and shows fittings, joints, flanges, etc. Price lists and tables of dimensions of fittings, valves, gates, flanges, etc., are also included. The catalog also contains some hydraulic tables, including those for weir dam measurements, flow of water through nozzles, flow of water through pipes, horsepower of water, pressure of water, etc.